REDACTED – FOR PUBLIC INSPECTION

SUPPLEMENTAL DECLARATION

OF

DENNIS ROBERSON

MAY 26, 2012

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Application of Cellco Partnership d/b/a	)	
Verizon Wireless and SpectrumCo LLC	)	
For Consent To Assign Licenses	)	WT Docket No. 12-4
	)	
Application of Cellco Partnership d/b/a	)	
Verizon Wireless and Cox TMI Wireless, LLC	)	
For Consent To Assign Licenses	)	

SUPPLEMENTAL DECLARATION OF DENNIS ROBERSON

1. I, Dennis Roberson, am the Founder, President and CEO of Roberson and Associates, LLC. On March 26, 2012, I submitted a Declaration attached as Exhibit A to the Reply of T Mobile, USA, Inc. to Opposition to Petition to Deny, WT Docket No. 12-4, filed March 26, 2012. My experience and qualifications are described in that Declaration.

Summary

2. In this Supplemental Declaration, I will provide additional data and analysis to address contentions made repeatedly in this proceeding by Verizon Wireless, SpectrumCo and Cox TMI Wireless ("Applicants"), regarding Verizon Wireless' purported (but, in fact, illusory) superiority to other carriers in the efficiency with which it makes use of spectrum in providing wireless service. As in my original Declaration, I will discuss Applicants' assertion that Verizon Wireless is more spectrally efficient under two alternative metrics: the first being the ratio of ***customer connections per MHz of spectrum*** (which I refer to herein as "Metric E_1") and the second being the ratio of ***spectrum share to customer connections share*** (which I refer to herein

as "Metric E_2"). Applicants have attempted to show that, by both these measures, Verizon Wireless is more efficient in its use of the RF spectrum than other providers. I showed in my original Declaration that Applicant's analysis as to both these metrics is so flawed as to render it useless for meaningful analysis. I showed when their analysis is corrected to address merely the most obvious of these flaws, it shows that Verizon Wireless is significantly *less* efficient than T-Mobile, particularly in the most spectrally constrained top markets.

3. Under my supervision and direction, Roberson and Associates has now supplemented and further refined its analysis and comparison of the spectrum efficiency of the T-Mobile and Verizon networks in the Top-50 cellular market areas under each of these two measures. As before, we correct for several critical errors in Applicants' analysis by: (i) removing from each operator's allocation spectrum it does not yet have, (ii) analyzing the data on a market-by-market basis rather than merely in the aggregate, (iii) correcting for the different network demands imposed by smartphone users compared to featurephone users, and (iv) correcting for the relative spectrum efficiency differences between high and low-band spectrum.

4. However, we also provide a comparison with the other two of the four largest carriers, adding AT&T and Sprint to the mix. In addition, we add another important variable to the analysis: the fact that not only do the carriers' relative penetrations of smartphones vary (with Verizon Wireless lagging the others) but also the relative data usage *per smartphone* is widely divergent between the carriers. For the most accurate account, this factor, too, must be considered, for a carrier whose smartphone users make significantly greater per capita data demands will be more efficient even if it serves the same *number* of users with the same relative smartphone penetration. Moreover, both this and the smartphone mix correction are important in light of the Commission's policy of fostering broadband wireless, since together, they fairly take

into account the fact that some carriers are significantly farther along than others at bringing broadband to their users.

5. In the discussion of the analysis and results below, I describe the mathematical methods we used in making not only the corrections we previously reported, but also the new correction described above. I also present graphs and tables comparing the spectral efficiency of the Verizon, T-Mobile, Sprint and AT&T networks. Figures 1-8 compare the spectral efficiency performance of these carriers' networks in the Top 50 markets[1] using Metric E_1: subscribers per MHz of bandwidth. In these Figures, a *higher* spectral efficiency number indicates better performance. As before, our graphs, unlike Verizon's flawed analysis, properly exclude from each operator's allocation spectrum that it does not yet have.[2] Figures 9-16 then compare the efficiency of the four networks in the Top 50 markets using Metric 2: that is, the ratio of the spectrum-share to customer-connections share. In Figures 9-16, a *lower* ratio indicates better performance. In each of these analyses, we proceed in the following sequence. In each of the two groups of Figures, we first provide, as a baseline, the raw analysis results under each spectrum efficiency metric, but not calculated on an aggregate basis as in the Applicants' invalid analysis, but on a market-by-market basis and removing from each operator's allocation spectrum that it does not yet have (referred to as "Scenario 0"). Then, we correct the analysis by adjusting for the carriers' differing smartphone penetrations: i.e., the percentage of all subscribers using smartphones, and present the results making only this correction (the analysis

[1] The analysis does not include San Juan, Puerto Rico, since Verizon Wireless does not use its own network to provide service there.

[2] Although the transfer of AT&T spectrum to T-Mobile has very recently been approved, obviously T-Mobile has not yet meaningfully begun to deploy this spectrum. The data upon which our (and Verizon Wireless') analysis is based concerns periods prior to the transfer and so this "break-up" spectrum is properly counted in AT&T's column rather than T-Mobile's. We do include Sprint's BRS spectrum in its column, since Sprint's deployment of this spectrum is well under way.

making only this correction referred to as "Scenario 1"). Next we layer on the correction for the differing smartphone per capita usage rates, and present the results showing the cumulative effect of both these corrections (referred to as "Scenario 2"). Last, we overlay the adjustment for the effects on efficiency of the differing propagation characteristics of low-band and high-band spectrum and show what conclusions are reached if all three corrections are made (referred to as "Scenario 3"). In addition, we supply below a list of the references we used (which are referred to in this Supplemental Declaration by list number), as well as an Appendix containing raw data used in developing and correcting the analysis.

6. The following Tables 1 and 2 summarize the market-by-market and corrected analysis results, under each of the three correction scenarios described above, for Metrics E_1 and E_2, averaged across the top 50 CMAs, respectively. Green highlight indicates best of the four carriers for that scenario and red highlight the worst.

Scenario	Smart-phone Mix Correction	Smart-phone Data Correction	Spectrum Correction	Verizon	AT&T	Sprint	TMUS
0	No	No	No	**10.32**	**9.47**	**5.89**	**7.72**
1	**Yes**	No	No	**10.32**	**13.22**	**9.45**	**9.51**
2	**Yes**	**Yes**	No	**9.14**	**9.42**	**11.04**	**15.60**
3	**Yes**	**Yes**	**Yes**	**11.11**	**12.21**	**18.91**	**31.20**

Table 1: Metric E_1 Average Efficiency (Top 50 CMAs, excluding Puerto Rico)

Scenario	Smart-phone Mix Correction	Smart-phone Data Correction	Spectrum Correction	Verizon	AT&T	Sprint	TMUS
0	No	No	No	**0.7807**	**0.8405**	**1.3535**	**1.0423**
1	**Yes**	No	No	**0.7807**	**0.6021**	**0.8430**	**0.8455**
2	**Yes**	**Yes**	**No**	**0.8822**	**0.8450**	**0.7216**	**0.5154**
3	**Yes**	**Yes**	**Yes**	**0.7180**	**0.6510**	**0.4207**	**0.2577**

Table 2: E_2 Metric Average Efficiency (Top 50 CMAs, excluding Puerto Rico)

7. Another possible scenario is that presented by T-Mobile personnel to the Commission's Staff in a meeting on May 11, 2012, in particular slide 7 of the presentation made at that meeting.[3]. That slide was prepared based on our previous analysis but applies the first refinement that we have made here -- the addition of AT&T and Sprint. When it was prepared, we had not yet had the opportunity to complete our second refinement (adding smartphone usage differences); it does apply the smartphone mix and spectrum corrections. To avoid needless verbosity, we have not included that intermediate refinement in our detailed analysis here. However, it can be summarized as follows in Tables 1-A and 2-A, and is fully consistent with the conclusions we reach as to Scenarios 2 and 3 here.

Smartphone Mix Correction	Smartphone Data Correction	Spectrum Correction	Verizon	AT&T	Sprint	TMUS
Yes	No	Yes	12.56	17.13	16.19	19.02

Table 1-A: E_1 Metric Average Efficiency (Top 50 CMAs, sans Puerto Rico)

Smartphone Mix Correction	Smartphone Data Correction	Spectrum Correction	Verizon	AT&T	Sprint	TMUS
Yes	No	Yes	0.6354	0.4639	0.4915	0.4227

Table 2-A: E_2 Metric Average Efficiency (Top 50 CMAs, sans Puerto Rico)

[CORRECTED TABLE]

8.The matrices in Table 3 below show how the carriers stack up on a "Best" (green) and "Worst" (red) basis in the Top 25 CMAs under each of the three corrected scenarios under Metric 1.

[3] *See* May 15, 2012, Letter of T-Mobile to Marlene H. Dortch in this docket, regarding this meeting, and slide 7 of the presentation attached thereto. For ease of reference a copy of this slide 7 is attached as Attachment A hereto

CMA 1 - 25				
CMA	Verizon	AT&T	Sprint	T-Mobile
Los Angeles, CA				
New York, NY-NJ				
Chicago, IL				
Dallas-Fort Worth, TX				
Houston, TX				
Philadelphia, PA				
Atlanta, GA				
Washington, DC-MD-VA				
Detroit, MI				
Boston, MA				
San Francisco, CA				
Miami, FL				
Phoenix, AZ				
Minneapolis-St. Paul, MN				
San Diego, CA				
Denver-Boulder, CO				
Baltimore, MD				
Seattle-Everett, WA				
St. Louis, MO-IL				
Tampa-St. Petersburg, FL				
San Juan-Caguas, PR				
Portland, OR-WA				
Sacramento, CA				
Pittsburgh, PA				
Las Vegas, NV				

Key: BEST WORST

Table 3: Scenario 1, Best and Worst Analysis by Market, Metric E_1.

CMA 1 - 25				
CMA	Verizon	AT&T	Sprint	T-Mobile
Los Angeles, CA				
New York, NY-NJ				
Chicago, IL				
Dallas-Fort Worth, TX				
Houston, TX				
Philadelphia, PA				
Atlanta, GA				
Washington, DC-MD-VA				
Detroit, MI				
Boston, MA				
San Francisco, CA				
Miami, FL				
Phoenix, AZ				
Minneapolis-St. Paul, MN				
San Diego, CA				
Denver-Boulder, CO				
Baltimore, MD				
Seattle-Everett, WA				
St. Louis, MO-IL				
Tampa-St. Petersburg, FL				
San Juan-Caguas, PR				
Portland, OR-WA				
Sacramento, CA				
Pittsburgh, PA				
Las Vegas, NV				

Key: BEST WORST

Table 4: Scenario 2 Summary, Best and Worst Analysis by Market, Metric E_1.

CMA 1 - 25				
CMA	**Verizon**	**AT&T**	**Sprint**	**T-Mobile**
Los Angeles, CA				
New York, NY-NJ				
Chicago, IL				
Dallas-Fort Worth, TX				
Houston, TX				
Philadelphia, PA				
Atlanta, GA				
Washington, DC-MD-VA				
Detroit, MI				
Boston, MA				
San Francisco, CA				
Miami, FL				
Phoenix, AZ				
Minneapolis-St. Paul, MN				
San Diego, CA				
Denver-Boulder, CO				
Baltimore, MD				
Seattle-Everett, WA				
St. Louis, MO-IL				
Tampa-St. Petersburg, FL				
San Juan-Caguas, PR				
Portland, OR-WA				
Sacramento, CA				
Pittsburgh, PA				
Las Vegas, NV				

Key: BEST WORST

Table 5: Scenario 3 Summary, Best and Worst Analysis by Market, Metric E_1.

Corrections to Efficiency Metric E_1

9. As discussed in my original Declaration, it is well known that the data and bandwidth consumed by a smartphone is many times that of a feature phone. For example, Verizon Wireless itself supports the statement that smartphones on average consume as much as 35 times the bandwidth consumed by feature phones. (See reference [2].) It is therefore clear that a carrier with a higher mix of smart to feature phones must make more efficient use of their spectrum (all other factors assumed to be equal).

10. We have analyzed this phone mix impact on spectrum usage. Mathematically, the first order correction for spectrum loading on a network, as a function simply of the percentage of all users who are smartphone users, can be expressed as follows.

$$B = Q_f + K^*Q_s\,,$$

where:

B = total spectrum loading (1 = equivalent loading by only feature phones)

Q_f = proportion of feature phones

Q_s = proportion of smartphones (note $Q_f + Q_s = 1$)

K = data usage multiplication factor of smartphone over a feature phone

We have defined a spectrum use efficiency metric (E_1) which is calculated for a specific carrier, and which can be expressed as follows:

$E_{1,i} = R*M_i / (F_i*W_i)$, with units k-Sub/MHz, where:

M_i = Number of subscribers served by the carrier in CMA number i (k-Sub)

F_i = carrier spectrum holdings in CMA number i (MHz)

R = the relative subscriber correction factor for the carrier as compared to a reference value of 14.6 (the value for a 40%/60% smart/feature phone mix with a 35x smartphone multiplication factor with respect to a feature phone).

$$R_{Carrier} = B_{Carrier} / 14.6$$

W_i = spectrum band value correction for CMA i

i = ordered index of top 50 U.S. CMAs (Puerto Rico excluded), 1=largest CMA.

The averaged efficiency of a given carrier across all CMAs is calculated as follows.

$$E_{1,T} = \Sigma^{49}_{i=1} E_{1,i} / 49$$

11. If the subscriber phone mix is included and the smartphone multiplication factor is simply fixed at 35x, per Verizon Wireless' above-cited estimate, the following data and parameters are used (see references [4] and [5]).[4] It should be noted that these were the same factors that were used in the smartphone mix correction in my original Declaration.

[4] A smartphone multiplier of 35x implies a feature phone bandwidth use equivalent to 30 MB/Mo. which represents data and voice usage.

Subscriber Mix	Verizon	TMUS[5]	AT&T	Sprint
Smart / Feature Phone %	40% / 60%	50% / 50%	57% / 43%	66% / 34%
Avg. Smartphone Data Usage (MB/Mo.)[6]	1025	1025	1025	1025
Smartphone Multiplication Factor	35.0	35.0	35.0	35.0
$R_{Carrier}$	1.0	1.233	1.397	1.605

Table 6: Data and Parameters for Scenario 1, Metric E1 (Corrections: SP Data-NO, SP Mix-YES, Spectrum-NO)

12. However, data also exists that shows that the carriers' respective smartphone users do *not* all use the same amount of data on a per-user basis. T-Mobile's users make the most intensive demands, averaging approximately 1700 MB/subscriber/month, according to a recent Wall Street Journal article [5]. This figure is 50% higher than the next highest, Sprint's 1200 MB/subscriber/month; it is nearly *twice* Verizon Wireless' figure (902 MB/subscriber/month) and more than twice AT&T's (724 MB/subscriber/month). The analysis can – and should – be further corrected for this difference. Thus, if the subscriber phone mix is included and the smartphone multiplication factor is varied to reflect these per carrier basis differences, the following data and parameters are used (see references [4] and [5]):

Subscriber Mix	Verizon	TMUS	AT&T	Sprint
Smart / Feature Phone %	40% / 60%	50% / 50%	57% / 43%	66% / 34%
Avg. Smartphone Data Usage (MB/Mo.)	902	1700	724	1200
Smartphone Multiplication Factor	30.80	58.05	24.72	40.98
$R_{Carrier}$	0.885	2.020	0.995	1.876

Table 7: Data and Parameters for Scenario 2, Metric E1 (Corrections: SP Data-YES, SP Mix-YES, Spectrum-NO)

[5] We understand that T-Mobile's smartphone penetration has more recently increased to approximately 60% of contract customers. However, since we do not have such recent data for all carriers, we use the 50% factor for T-Mobile here to permit an apples-to-apples comparison. Note that T-Mobile's efficiency measure here would *increase* considerably if we used the 60% number, so our approach is also conservative.

[6] This constant value of 1025 MB/Mo. was calculated as the aggregate monthly smartphone traffic divided by the total number of smartphone subscribers across the four carriers based on the information contained in references [4] and [5].

13. The results of our corrected analysis under Metric E_1 are shown graphically in Figures 1-8 below. Each of the four scenarios is represented by two graphs, the first for the Top 25 CMAs (except Puerto Rico) and the second for CMAs 26-50. The test of Verizon Wireless' claim that it is the most efficient user of spectrum can be tabulated as follows:

Top 50 Markets -- BEST in Market	TMUS	Verizon	AT&T	Sprint
Scenario 0 (Uncorrected Market-by-market)	2	25	22	0
Scenario 1 (Smartphone Mix Correction Only)	4	14	29	2
Scenario 2 (Smartphone Mix and Usage Corrections Only)	26	9	4	10
Scenario 3 (Smartphone Mix and usage and Spectrum Corrections)$_r$	34	2	3	10

Table 8: Metric E_1 Best by Market (Top 50 CMAs, excluding Puerto Rico)

14. As can readily be seen, *only* in the uncorrected market-by-market analysis does Verizon efficiency match the efficiency of the other carriers. Making even the simplest correction -- that for smartphone mix -- puts Verizon Wireless far behind AT&T in the number of Top 50 markets in which it leads. Corrected further for smartphone *usage* as well as mix, the analysis shows that T-Mobile, with its high per capita smartphone data usage, is the leader in many markets, with Verizon Wireless now coming in third, after Sprint. Finally, when the correction for spectrum propagation characteristics is made, Verizon Wireless leads in only two of the Top 50 markets, putting it in last place among the four largest carriers. Because these results are disaggregated by market, they are more revealing than the averaged results set forth in Table 1 above, but both trend in the same direction.

Efficiency Plots

Scenario 0, Metric E_1: Corrections: SP Data-No; SP Mix-No; Spectrum-No

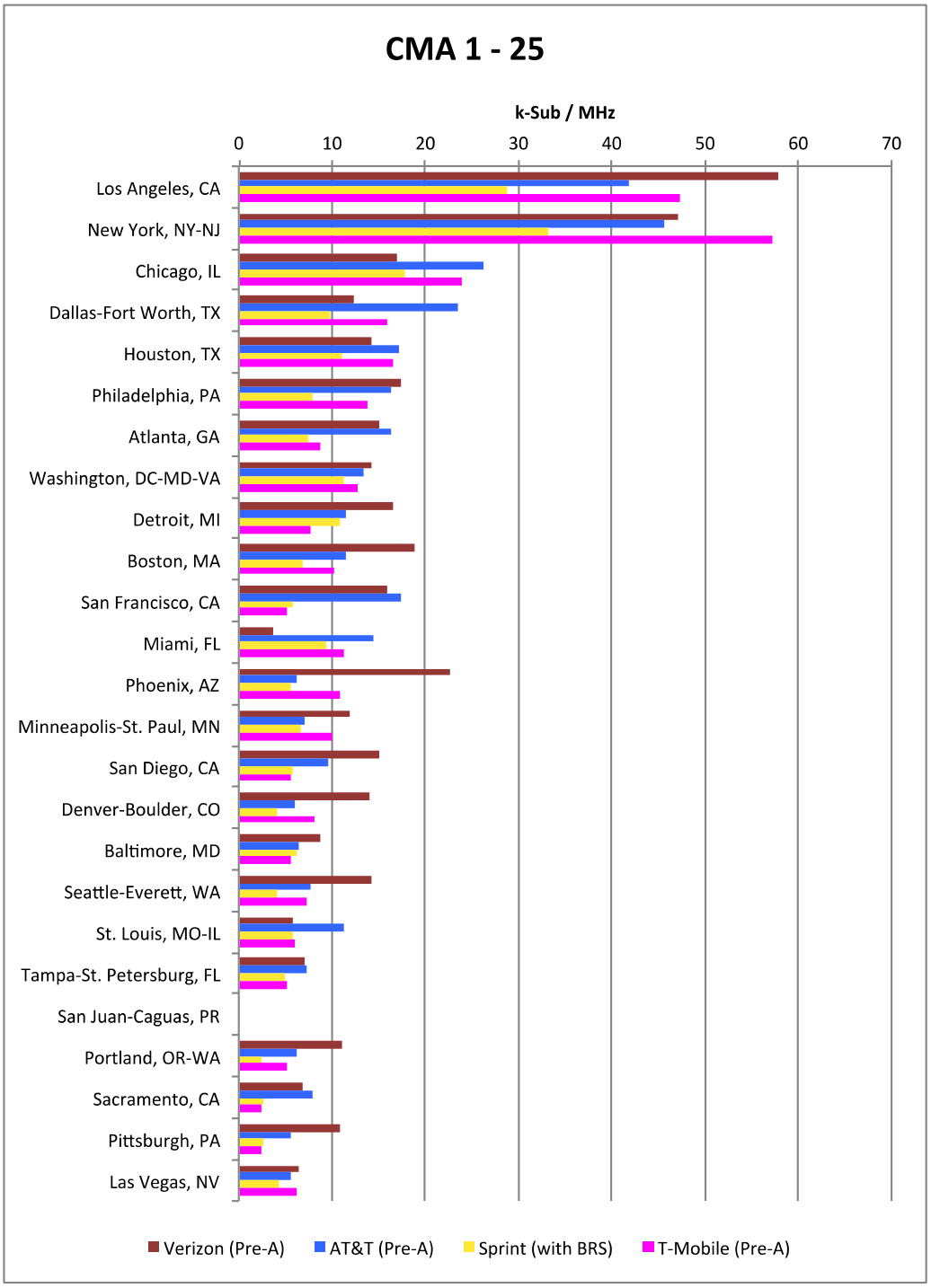


Figure 1: Scenario 0, Metric E_1 (Corrections: SP Data-NO, SP Mix-NO, Spectrum-NO)

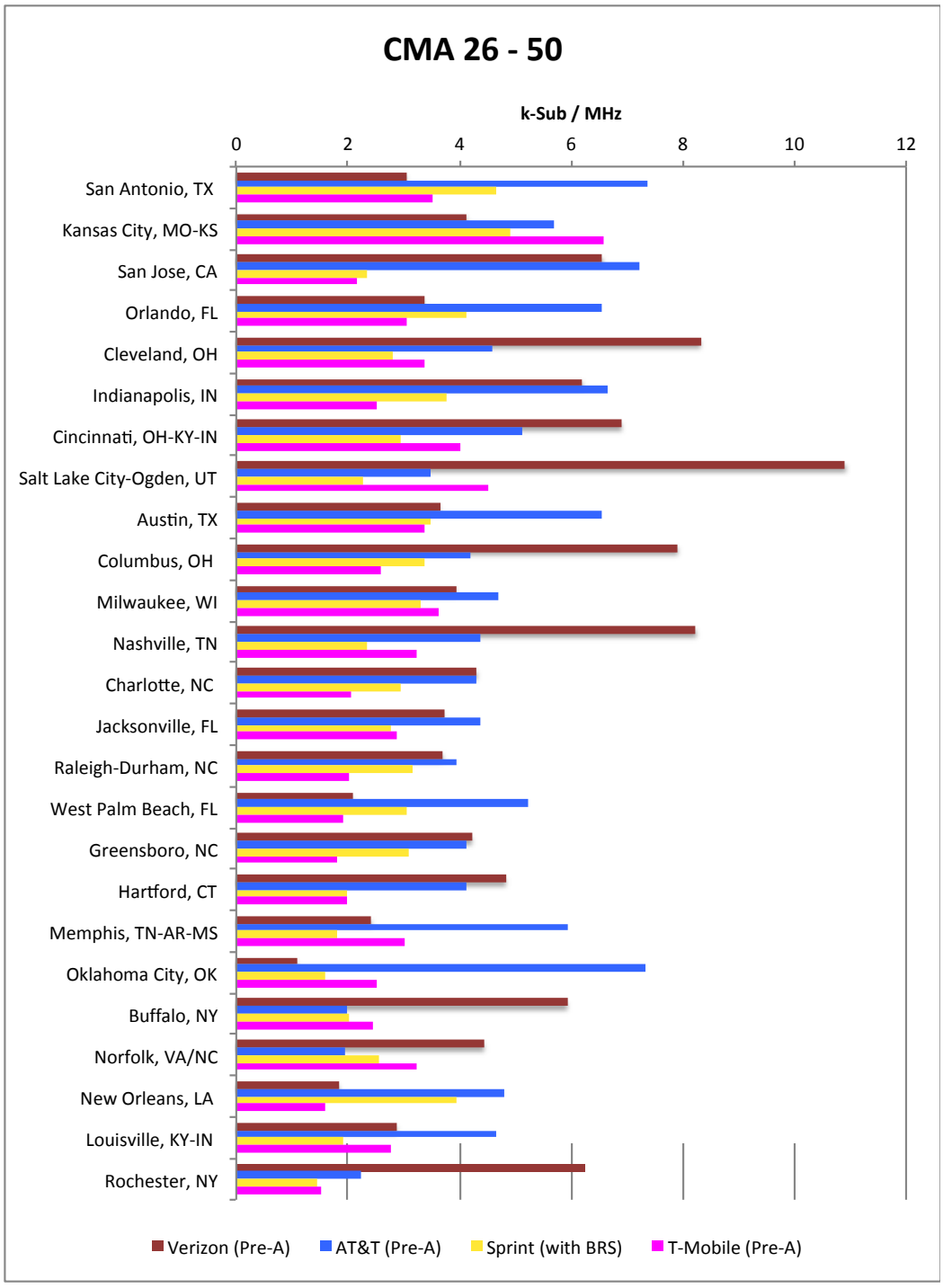


Figure 2: Scenario 0, Metric E_1 (Corrections: SP Data-NO, SP Mix-NO, Spectrum-NO)

Scenario 1, Metric E_1: Corrections: SP Data-No; SP Mix-Yes; Spectrum-No

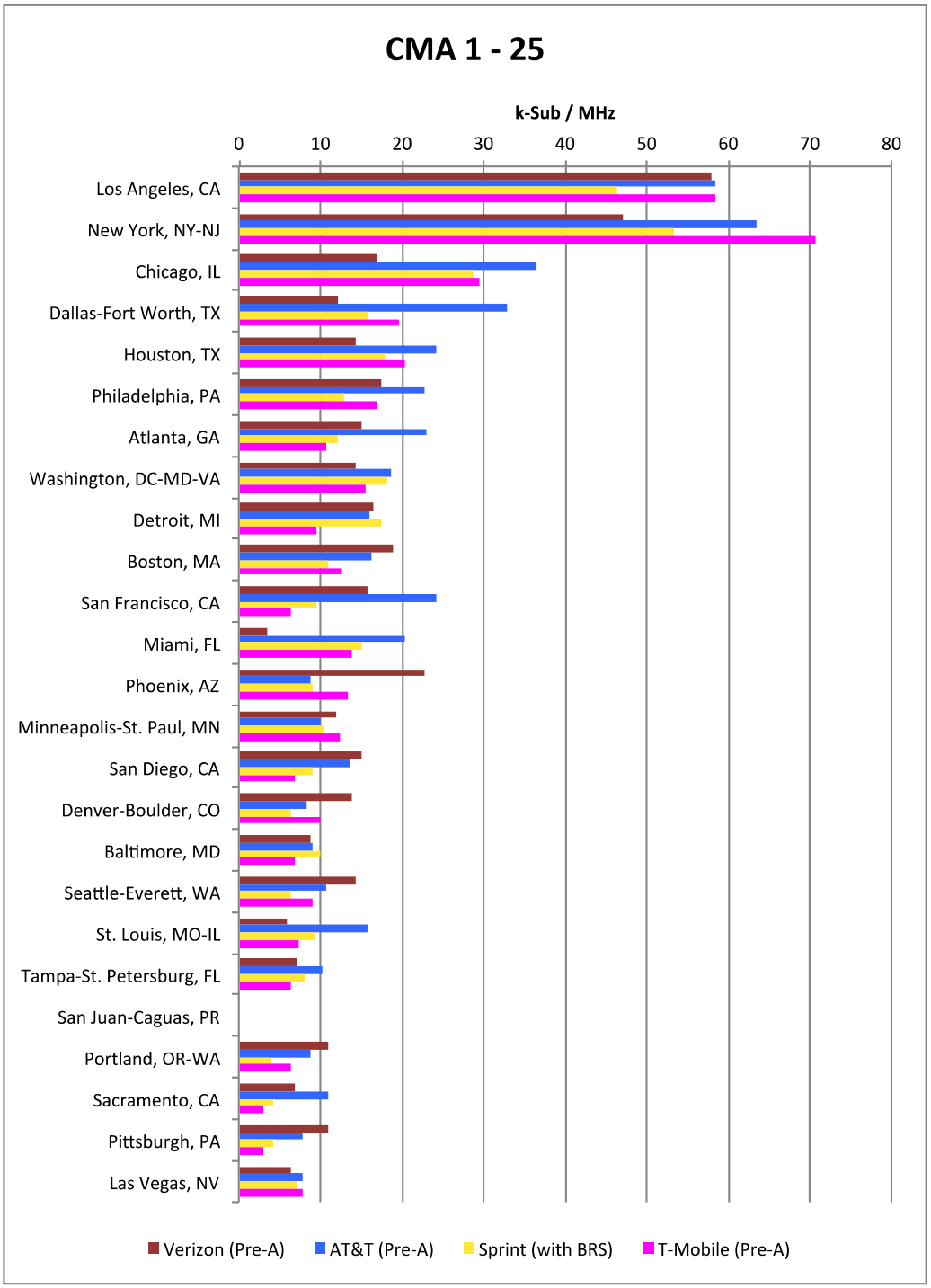


Figure 3: Scenario 1, Metric E_1 (Corrections: SP Data-NO, SP Mix-YES, Spectrum-NO)

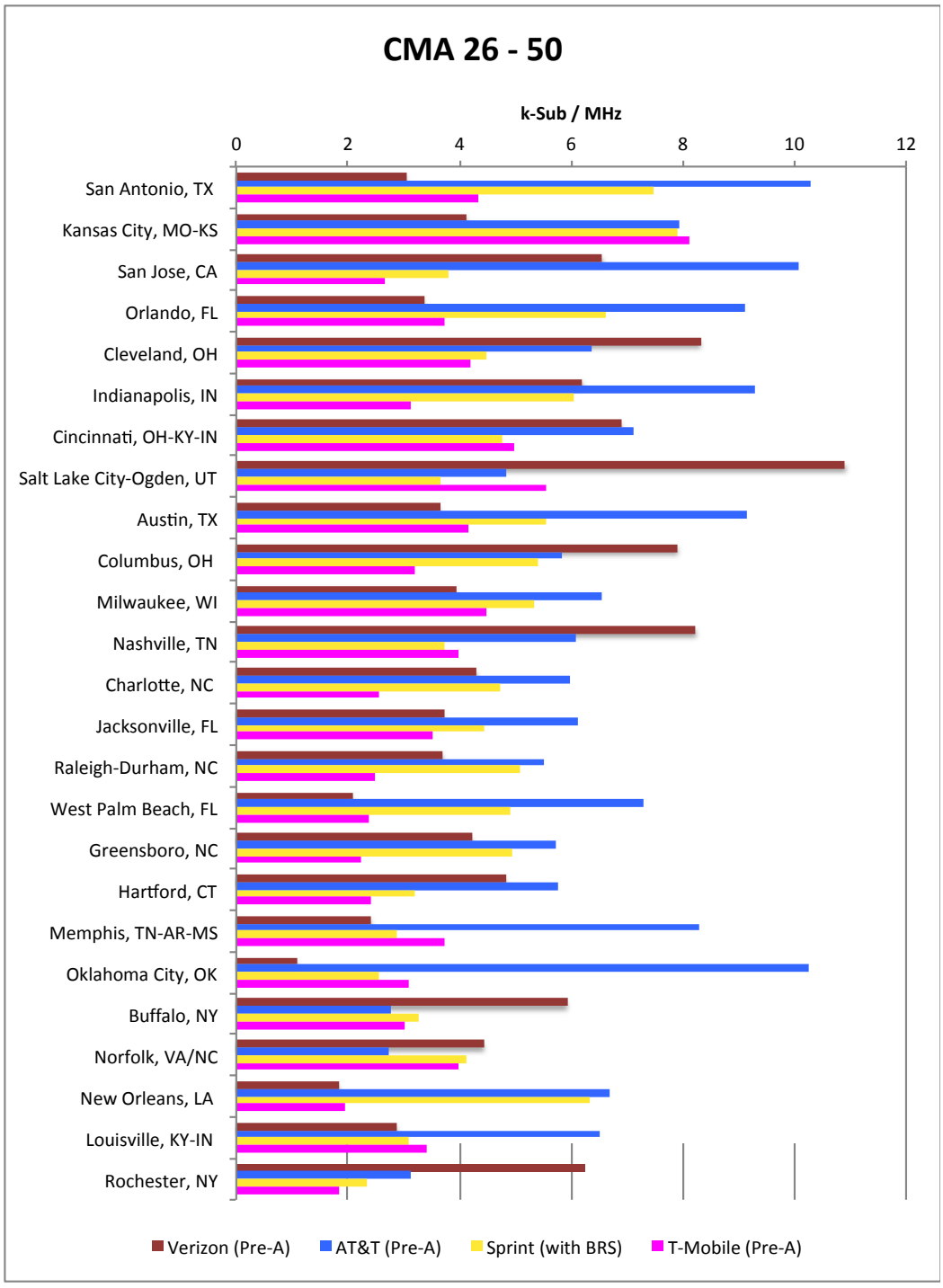


Figure 4: Scenario 1, Metric E_1 (Corrections: SP Data-NO, SP Mix-YES, Spectrum-NO)

Scenario 2, Metric E_1: Corrections: SP Data-Yes; SP Mix-Yes; Spectrum-No

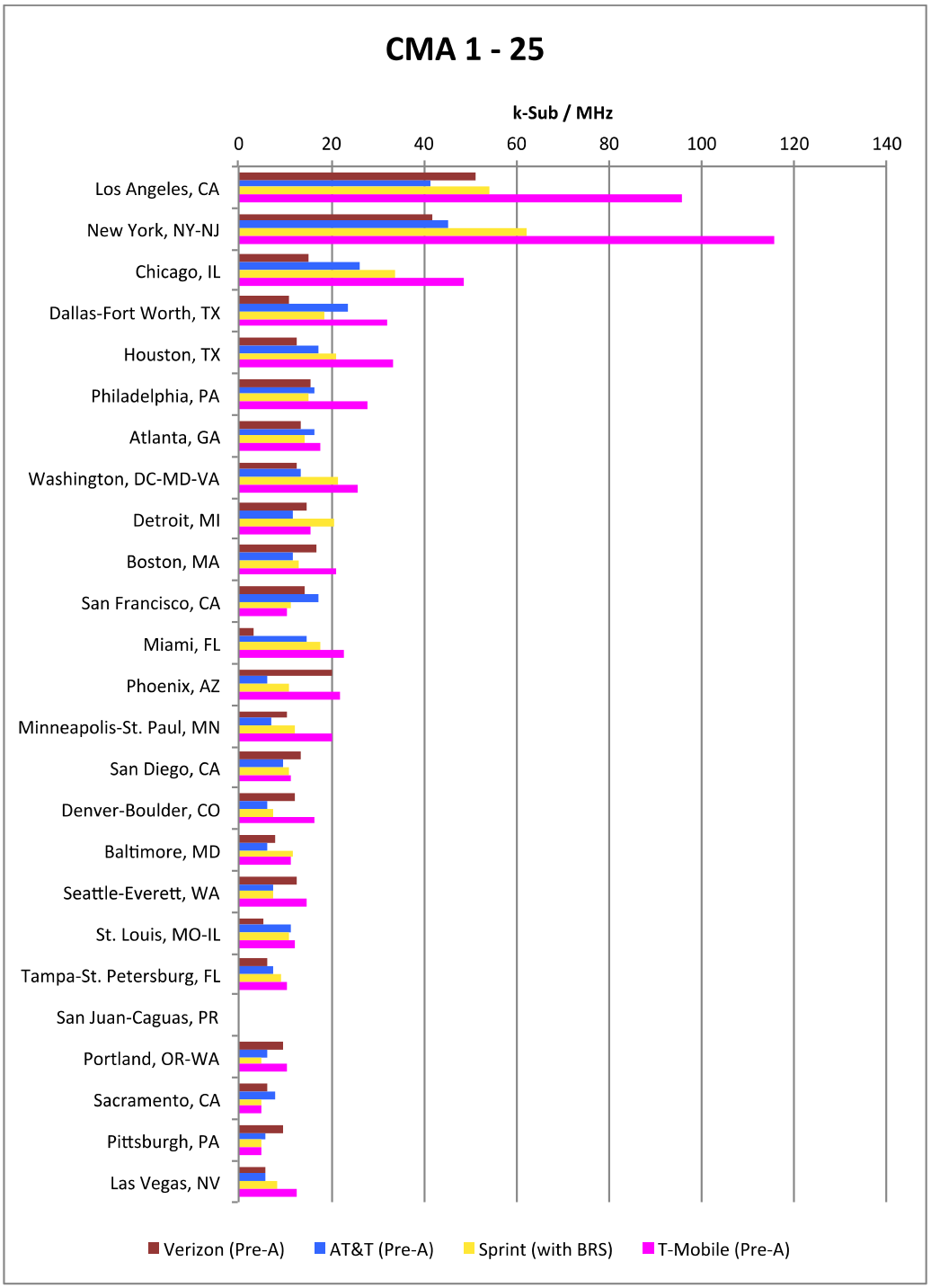


Figure 5: Scenario 2, Metric E_1 (Corrections: SP Data-YES, SP Mix-YES, Spectrum-NO)

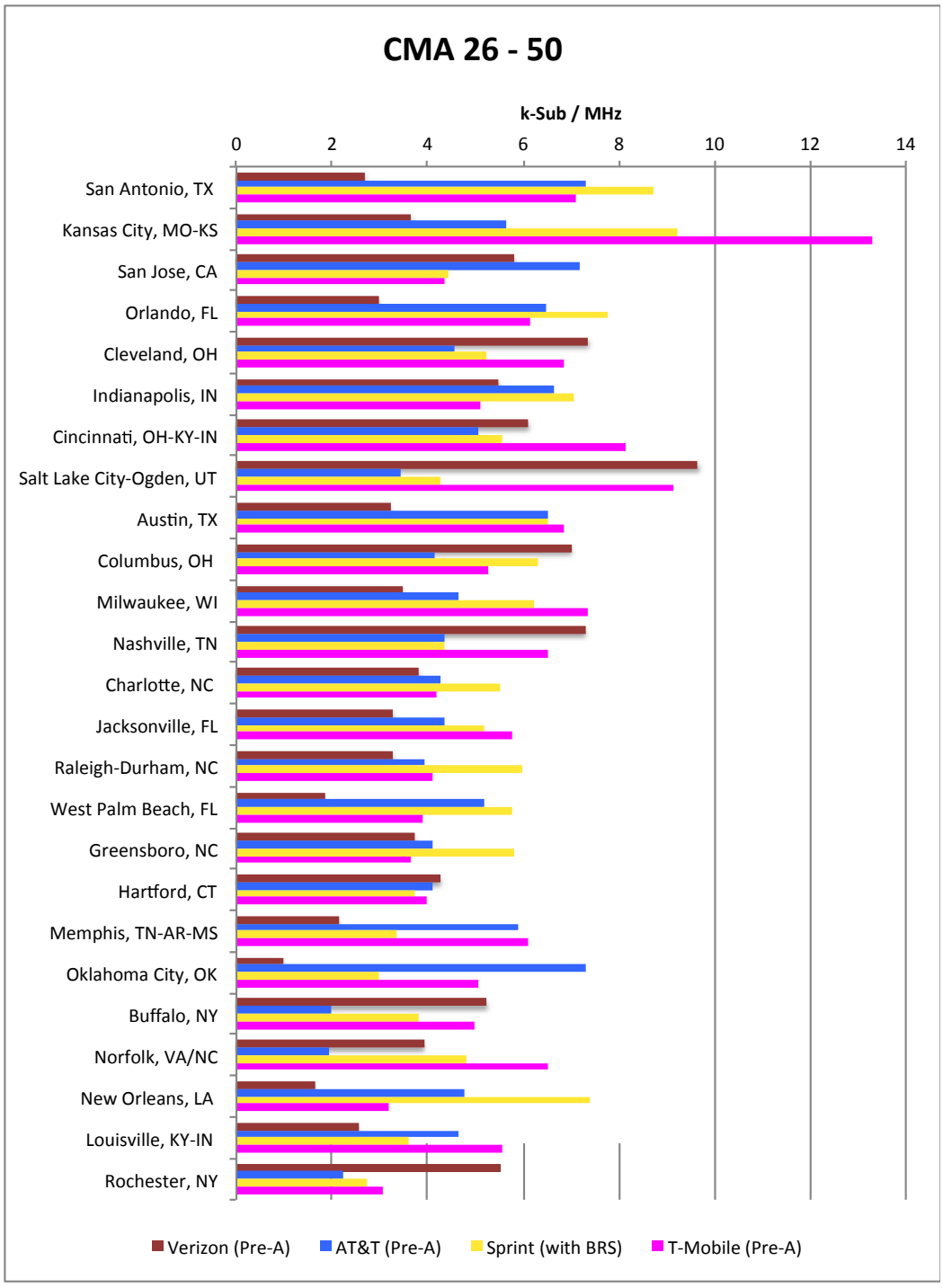


Figure 6: Scenario 2, Metric E_1 (Corrections: SP Data-YES, SP Mix-YES, Spectrum-NO)

Scenario 3, Metric E_1: Corrections: SP Data-Yes; SP Mix-Yes; Spectrum-Yes

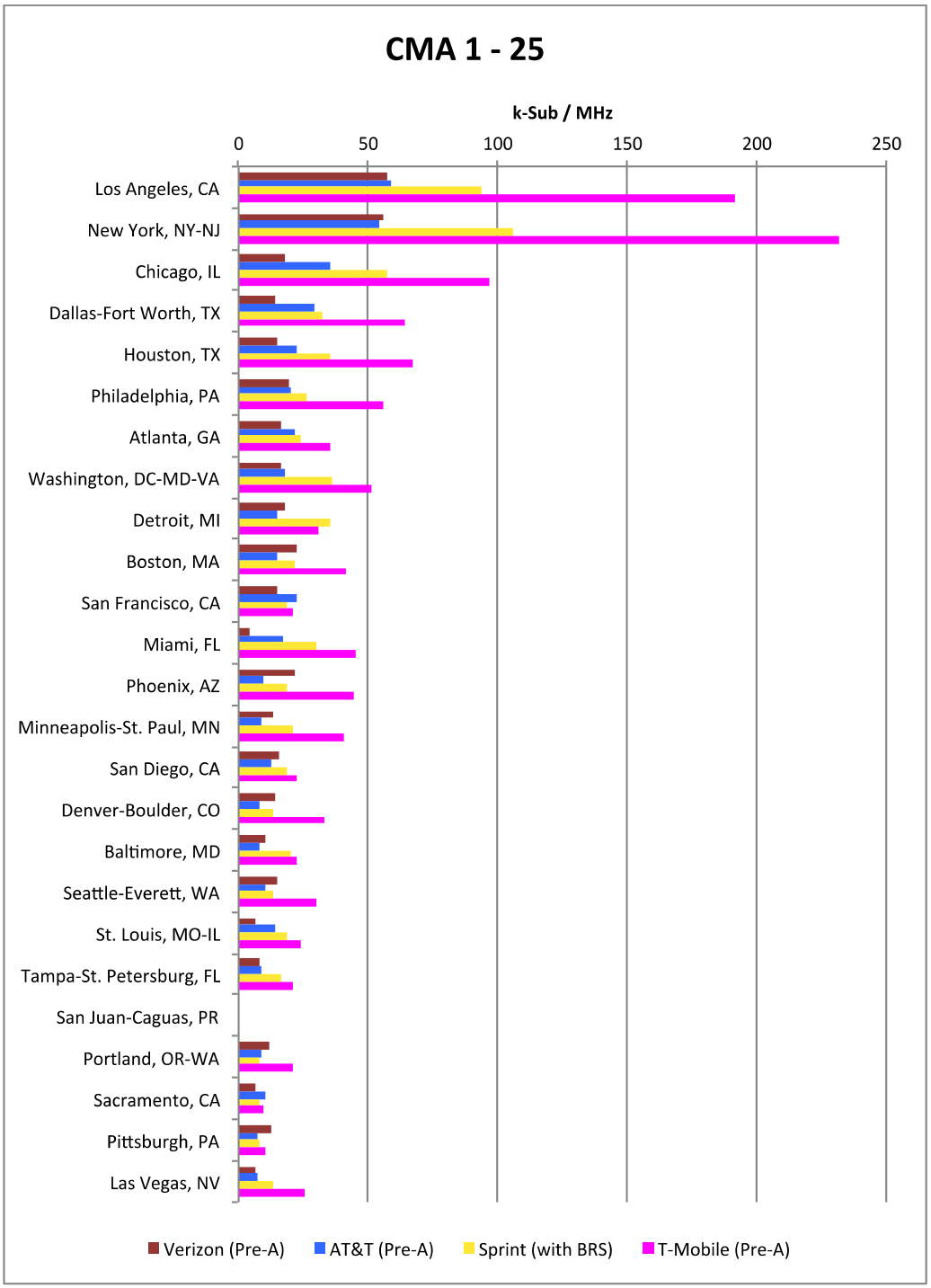


Figure 7: Scenario 3, Metric E_1 (Corrections: SP Data-YES, SP Mix-YES, Spectrum-YES)

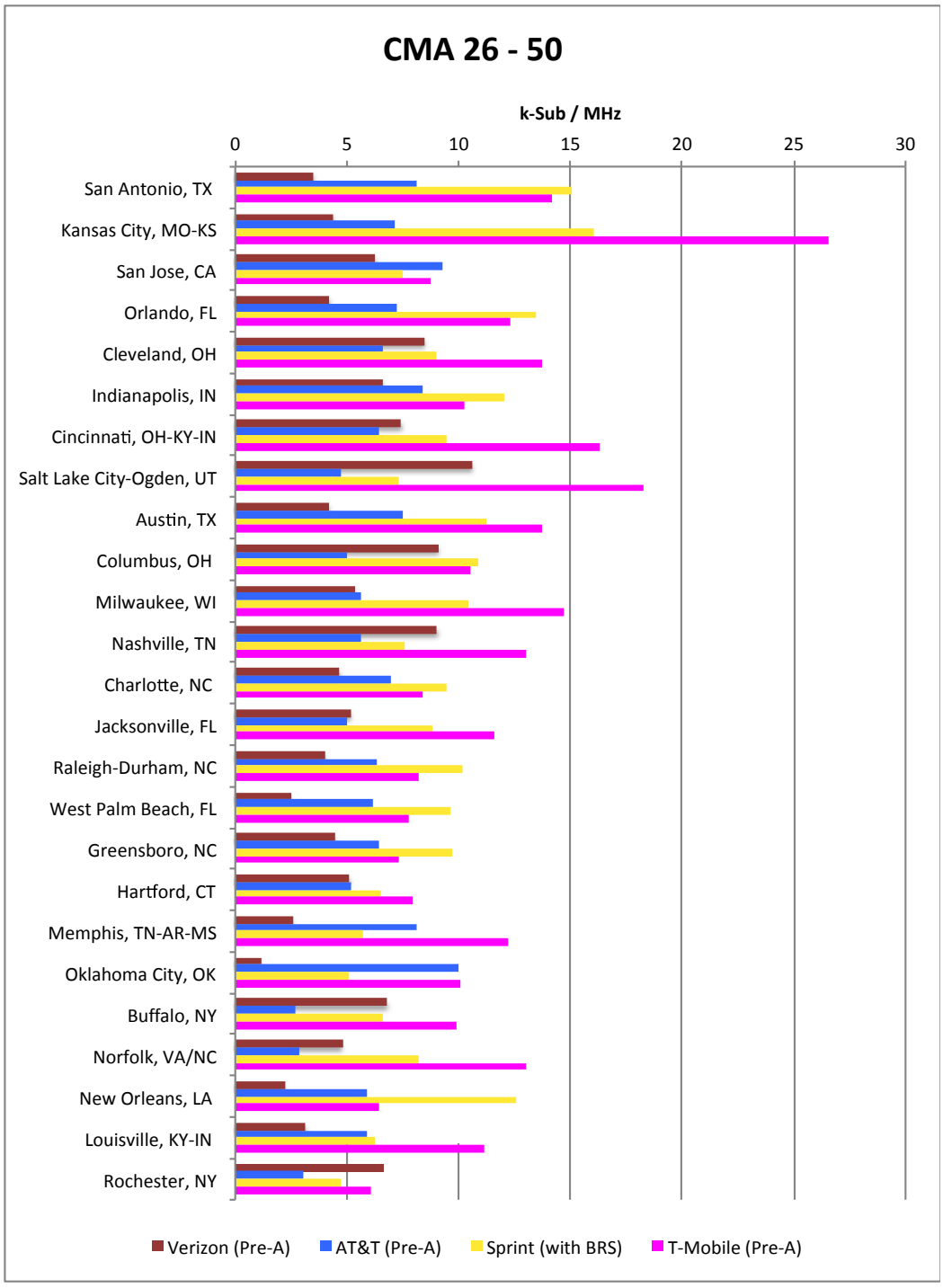


Figure 8: Scenario 3, Metric E_1 (Corrections: SP Data-YES, SP Mix-YES, Spectrum-YES)

Corrections to Efficiency Metric E_2

15. As with Metric E_1, we have also prepared a corrected analysis using Verizon Wireless' proposed Metric E_2. making the same three corrections as we made above for Metric E_1. The mathematics works as follows. Note that the calculations and parameters reflect the characteristics of each specific carrier. S_i is the "Spectrum Share" metric for CMA number *i*, and S_T is the total "Spectrum Share" across the top 50 U.S. CMAs. C_i is the "Customer Share" metric for CMA number *i*, and C_T is the total "Spectrum Share" across the top 50 U.S. CMAs. Thus:

$$S_i = W_i * F_i / R * F_T$$

$$C_i = M_i / P_i$$

and:

$$S_T = \Sigma^{49}_{i=1} (W_i * F_i * P_i) / \Sigma^{49}_{i=1} (R * F_T * P_i)$$

$$C_T = \Sigma^{49}_{i=1} M_i / \Sigma^{49}_{i=1} P_i$$

where:

R = the relative subscriber correction factor for the carrier as compared to a reference value of 14.6 (the value for a 40%/60% smart/feature phone mix with a 35x smartphone multiplication factor with respect to a feature phone).

$$R_{Carrier} = B_{Carrier} / 14.6$$

W_i = spectrum band value correction factor in CMA i

F_i = carrier spectrum holdings in CMA number *i* (MHz)

F_T = the total available spectrum for carrier use in a CMA (= 399 MHz for all CMAs)[7]

M_i = Number of subscribers served by the carrier in CMA number *i*

P_i = total number of Pops in CMA number *i*

[7] This does not include PCS G-block spectrum that Sprint has not fully deployed.

i = ordered index of top 50 U.S. CMAs (Puerto Rico excluded), 1=largest CMA. $E_{V,i}$ is the inferred Verizon efficiency metric for CMA number i, and $E_{V,T}$ is the inferred total Verizon efficiency metric across the top 50 U.S. CMAs.

$$E_{2,i} = S_i / C_i$$

$$E_{2,T} = S_T / C_T$$

16. As above for Metric E_1, the results of our corrected analysis under Metric E_2 are shown graphically in Figures 9-16 below. To each of the four scenarios is devoted two graphs, the first for the Top 25 CMAs (except Puerto Rico, where Verizon Wireless does not provide service using its own network) and the second for CMAs 26-50. The results can be tabulated as follows:

Top 50 Markets -- BEST in Market	TMUS	Verizon	AT&T	Sprint
Scenario 0 (Verizon Wireless Uncorrected)	2	25	22	0
Scenario 1 (Smartphone Mix Correction Only)	4	14	29	2
Scenario 2 (SmartpPhone Mix and Usage Corrections Only)	26	9	4	10
Scenario 3 (Smartphone Mix and usage and Spectrum Corrections)$_r$	34	2	3	10

Table 9: Metric E_2 Best by Market (Top 50 CMAs, excluding Puerto Rico)

17. The results here for Metric E_2 are fully consistent with those shown above for Metric E_1. Here again, *only* in the uncorrected market-by-market analysis does Verizon efficiency match that of the other carriers. Making only the correction for smartphone mix again puts Verizon Wireless well behind AT&T in the number of Top 50 markets in which it leads. Corrected further for smartphone *usage*, the analysis again shows that T-Mobile is the leader in far and away the most markets, with Verizon Wireless now coming in third, after Sprint. Finally, adding the correction for spectrum propagation characteristics is made, Verizon Wireless again

leads in only two of the Top 50 markets, putting it in last place among the four largest carriers. As before, though these results are disaggregated by market, and therefore are more revealing than the averaged results set forth in Table 2 above, both trend in the same direction.[8]

[8] Note that the T-Mobile and Verizon Wireless bars in Figures 11 and 12 match those from Table 5 in my original Declaration. For this scenario, the analysis is the same, but AT&T and Sprint have been added.

Efficiency Plots

Scenario 0, Metric E_2: Corrections: SP Data-No; SP Mix-No; Spectrum-No

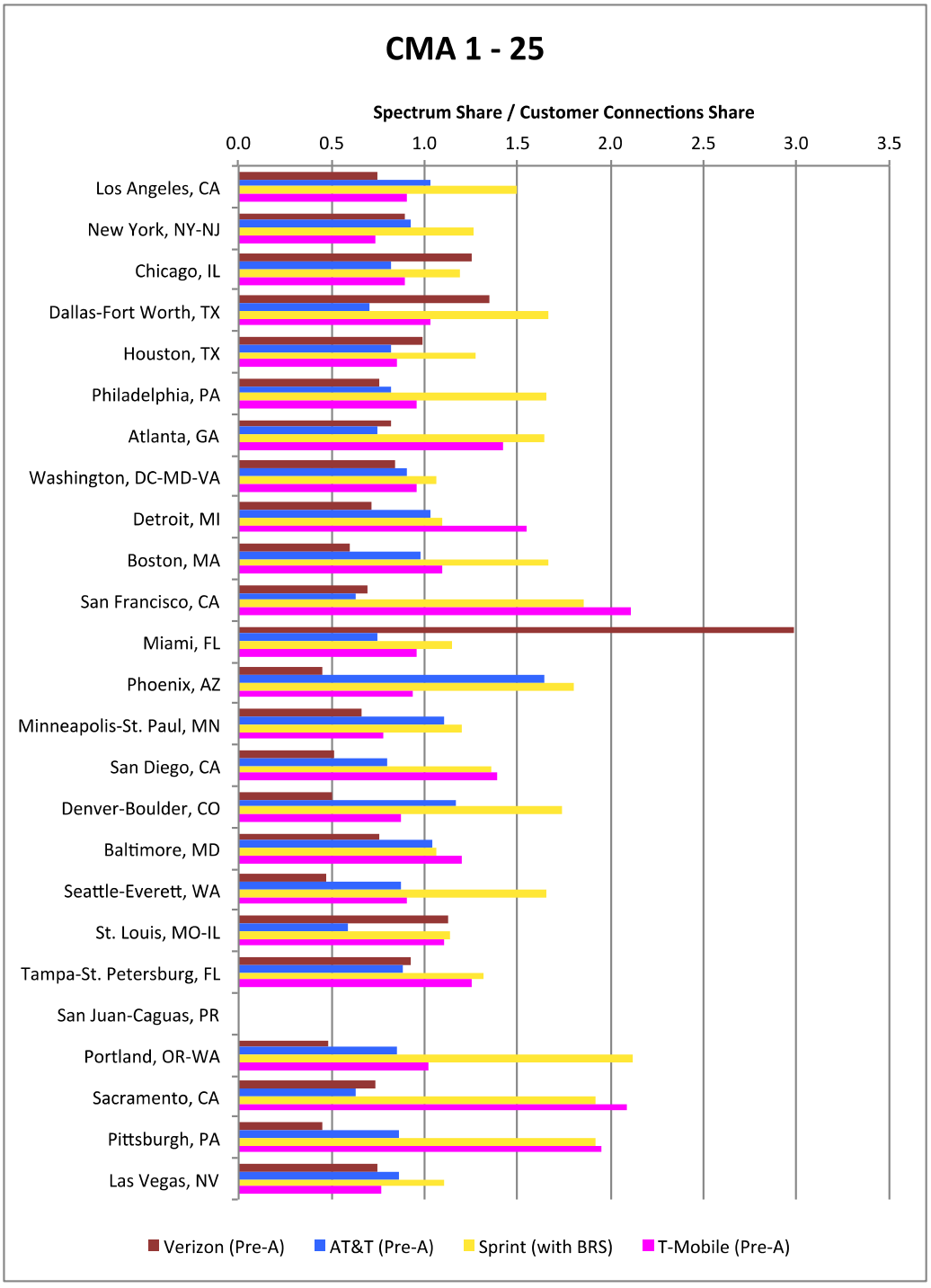


Figure 9: Scenario 0, Metric E_2 (Corrections: SP Data-NO, SP Mix-NO, Spectrum-NO) (smaller is better)

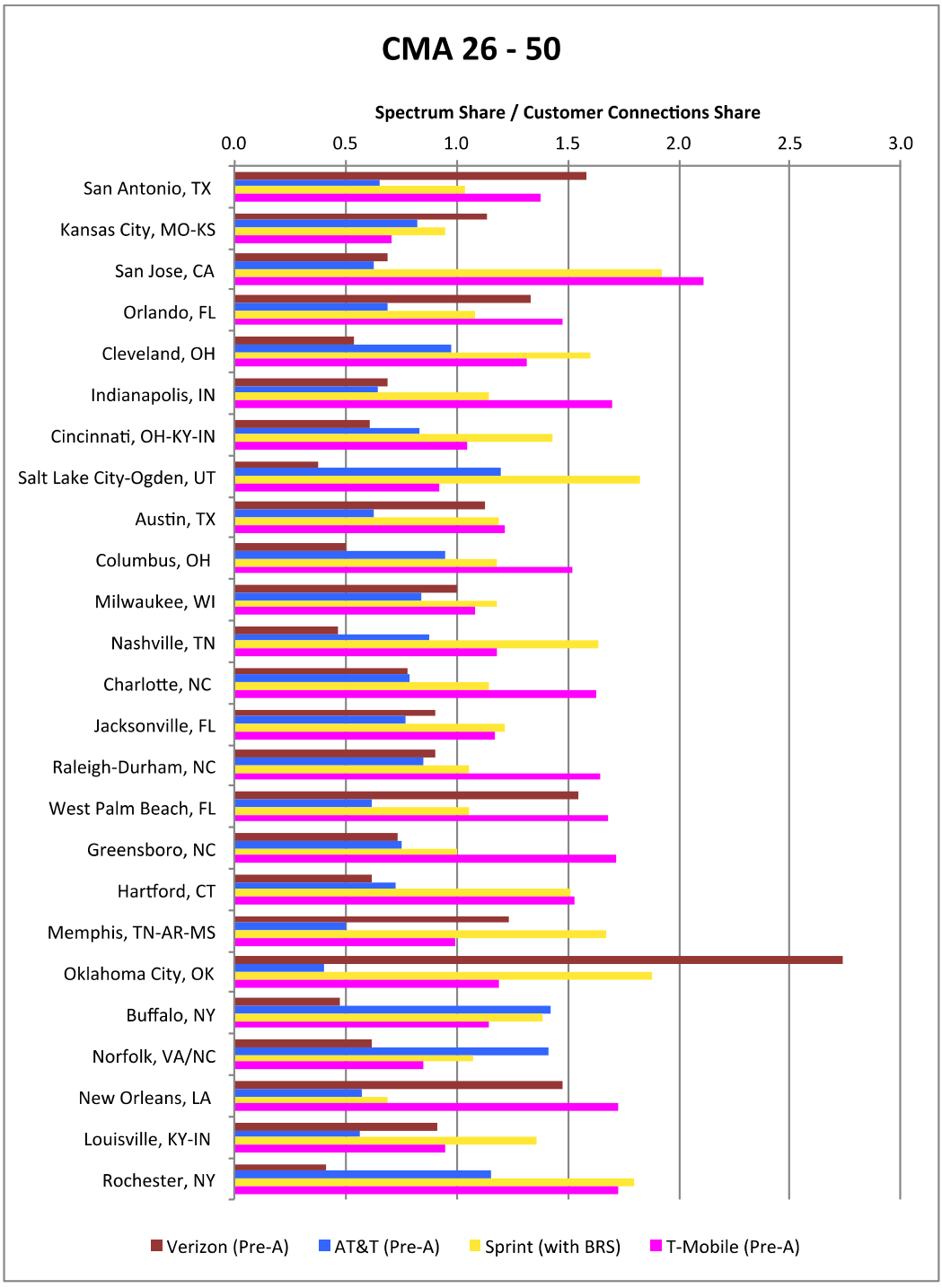


Figure 10: Scenario 0, Metric E_2 (Corrections: SP Data-NO, SP Mix-NO, Spectrum-NO) (smaller is better)

Scenario 1, Metric E_2: Corrections: SP Data-No; SP Mix-Yes; Spectrum-No

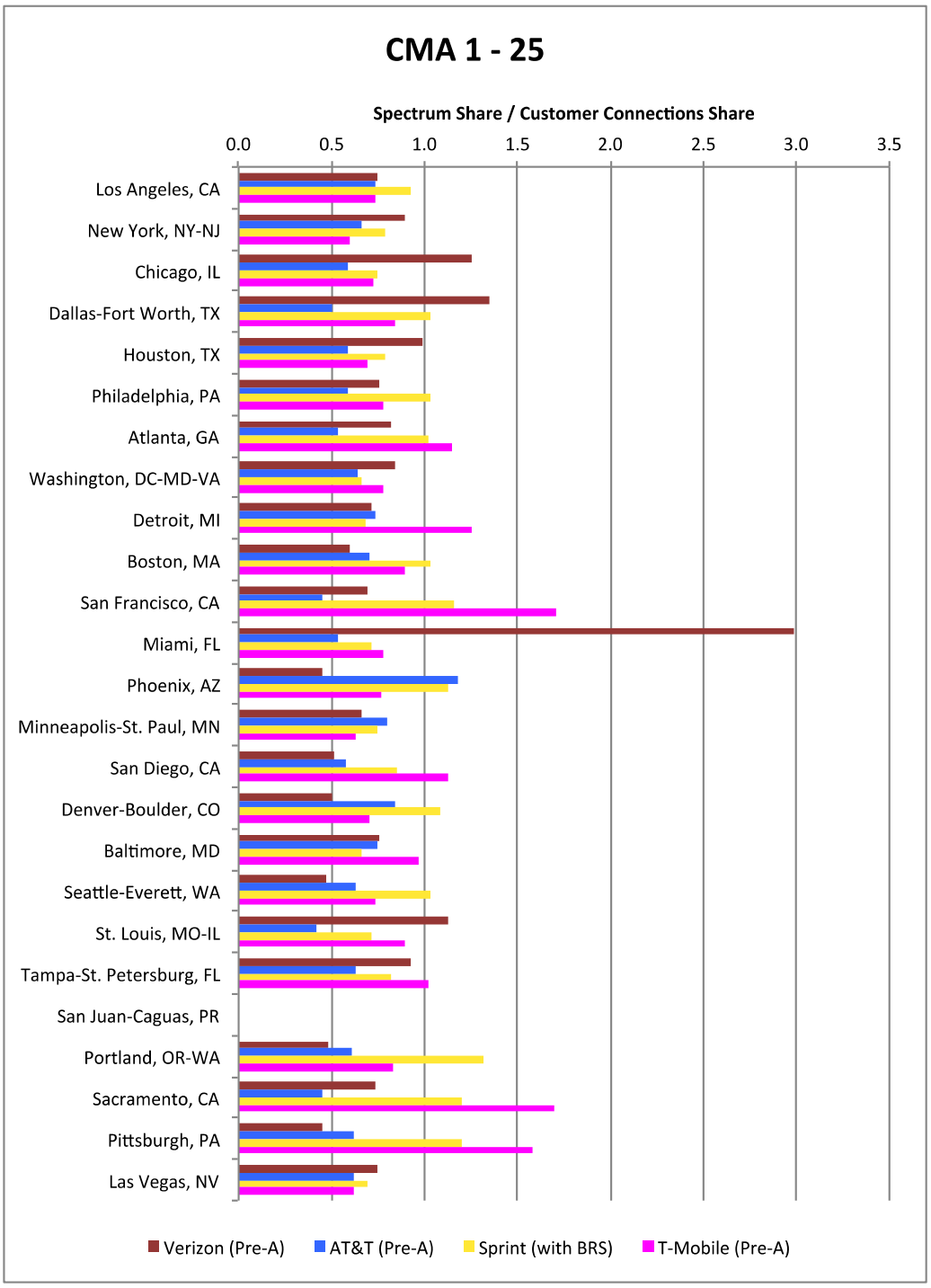


Figure 11: Scenario 1, Metric E_2 (Corrections: SP Data-NO, SP Mix-YES, Spectrum-NO) (smaller is better)

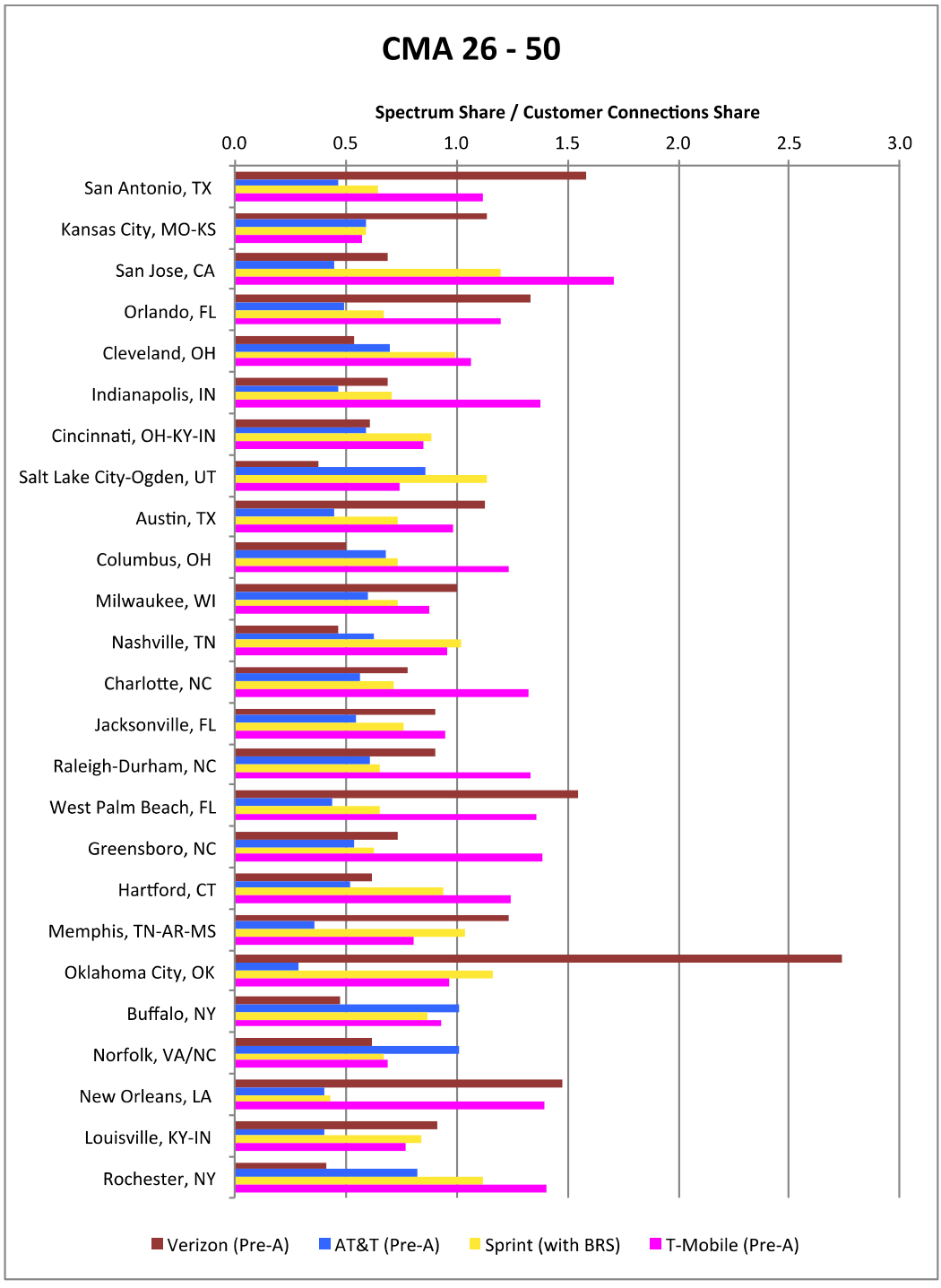


Figure 12: Scenario 1, Metric E_2 (Corrections: SP Data-NO, SP Mix-YES, Spectrum-NO) (smaller is better)

Scenario 2, Metric E_2: Corrections: SP Data-Yes; SP Mix-Yes; Spectrum-No

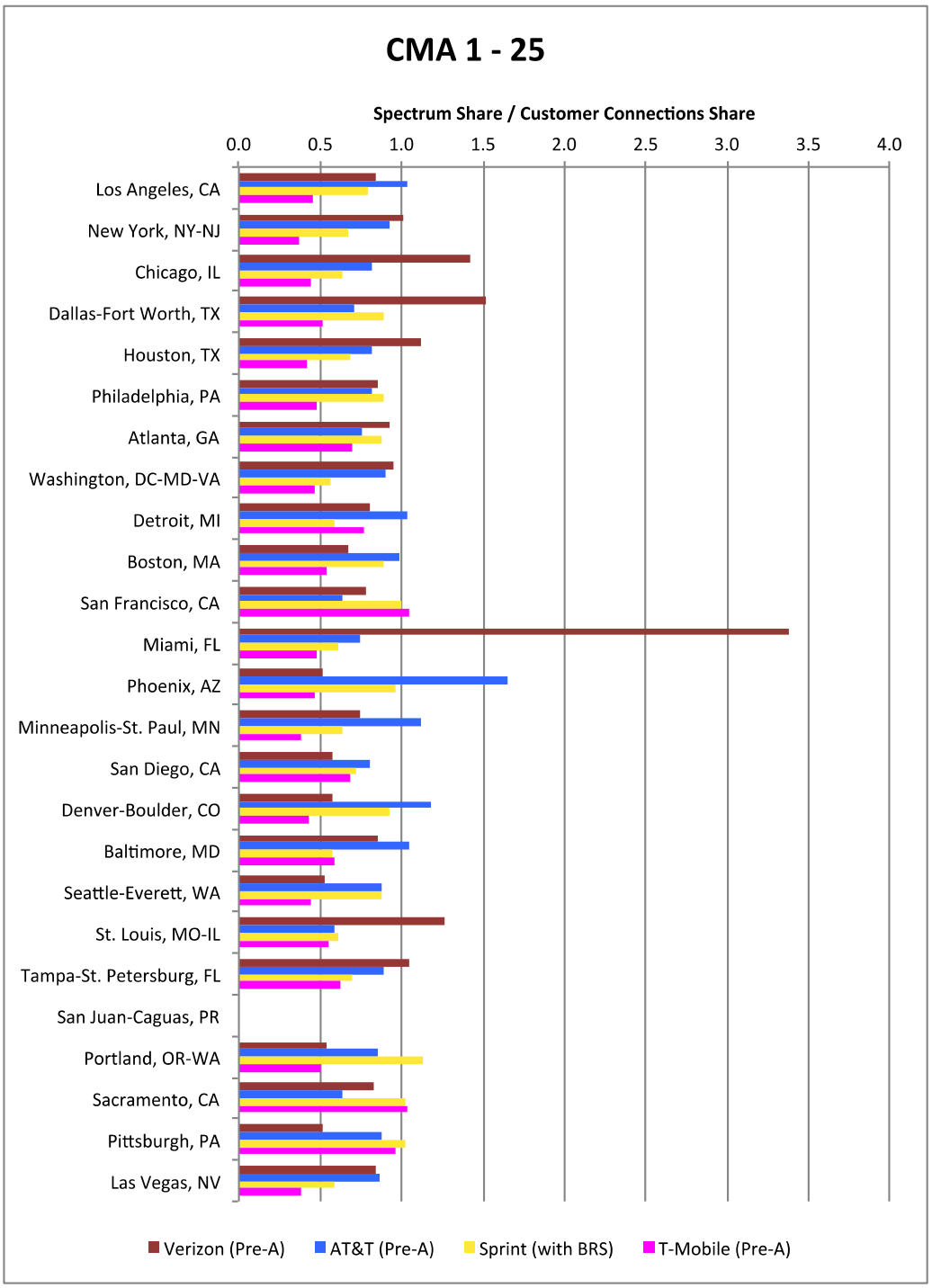


Figure 13: Scenario 2, Metric E_2 (Corrections: SP Data-YES, SP Mix-YES, Spectrum-NO) (smaller is better)

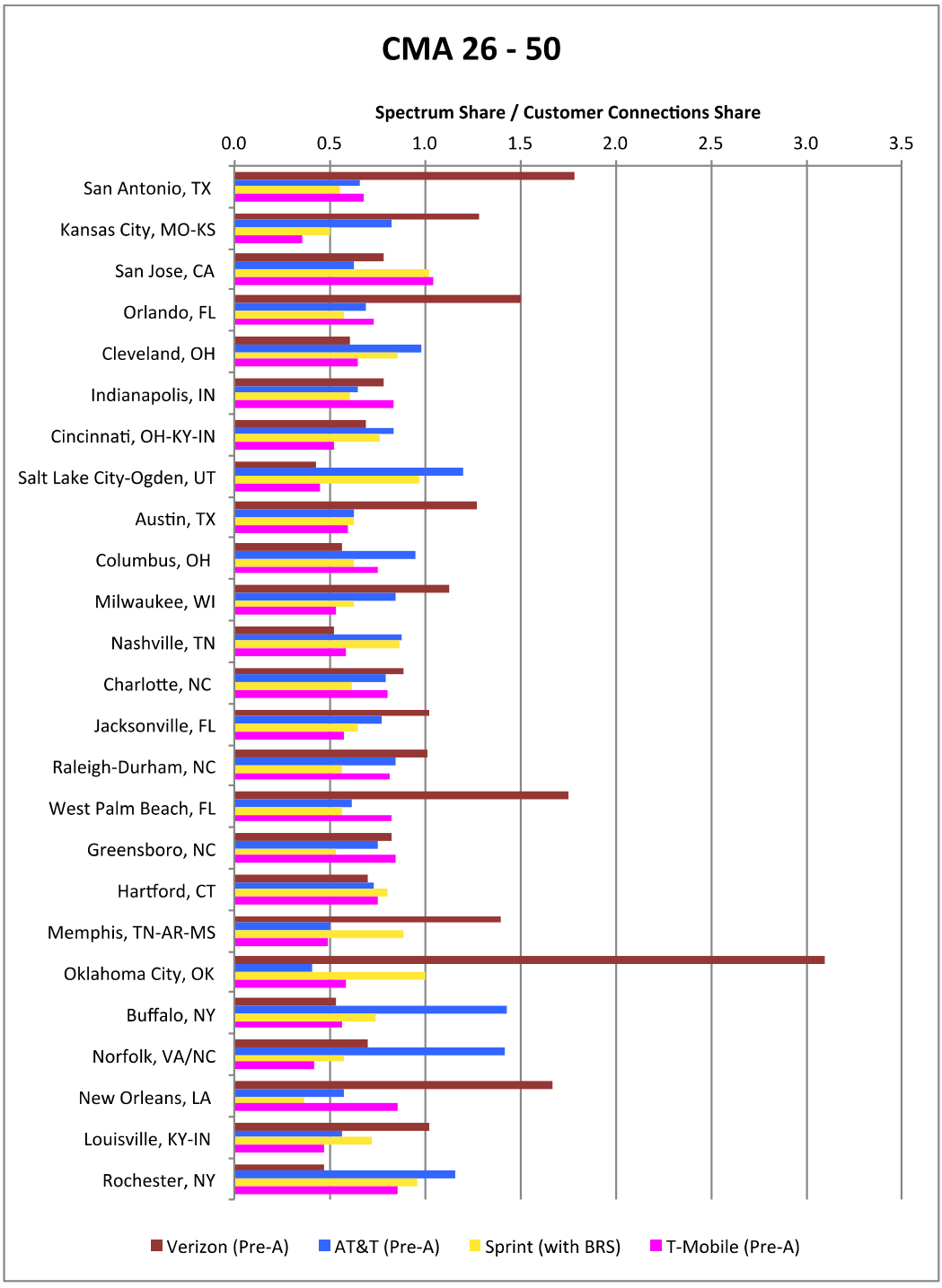


Figure 14: Scenario 2, Metric E_2 (Corrections: SP Data-YES, SP Mix-YES, Spectrum-NO) (smaller is better)

Scenario 3, Metric E_2: Corrections: SP Data-Yes; SP Mix-Yes; Spectrum-Yes

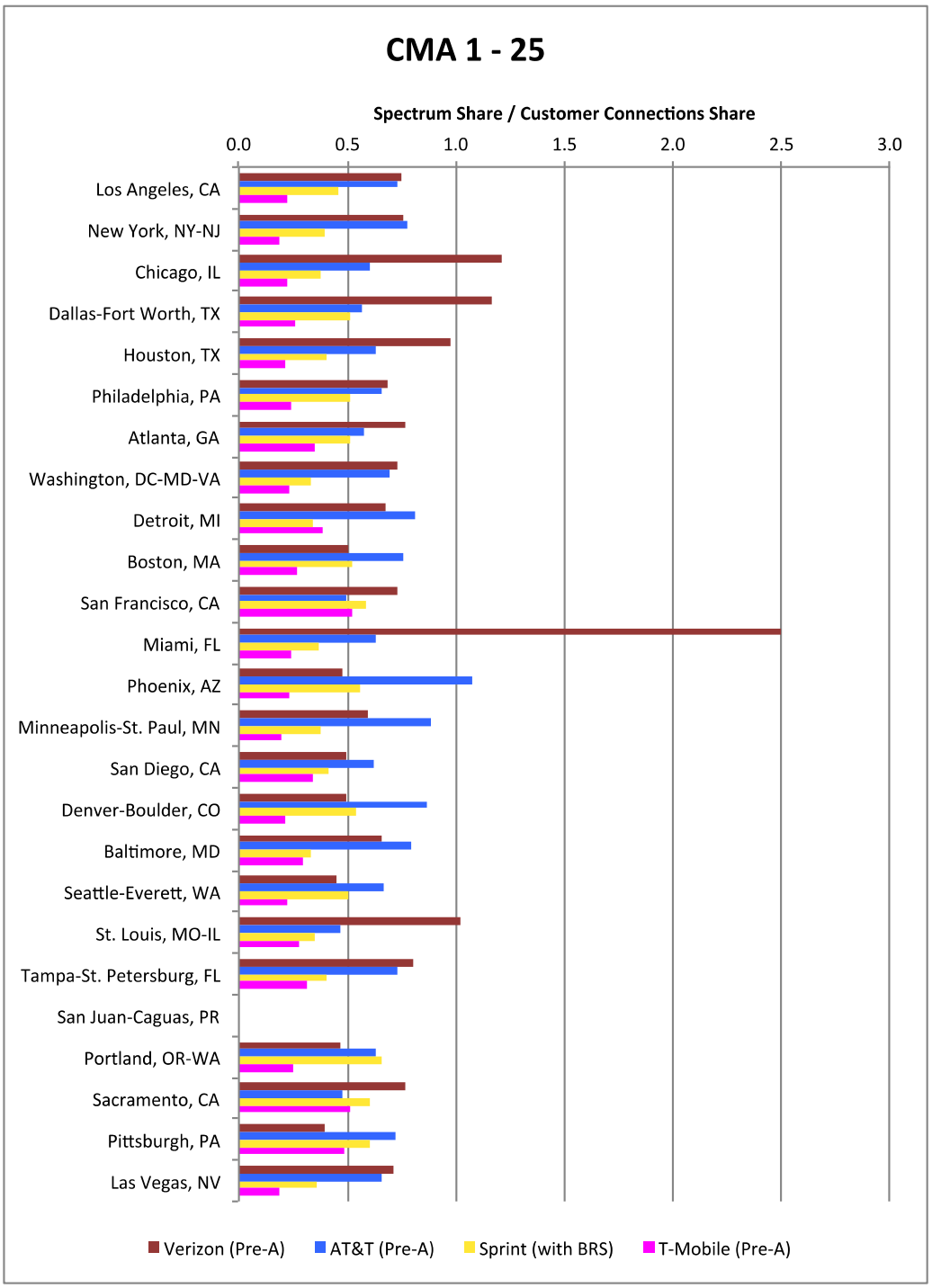


Figure 15: Scenario 3, Metric E_2 (Corrections: SP Data-YES, SP Mix-YES, Spectrum-YES) (smaller is better)

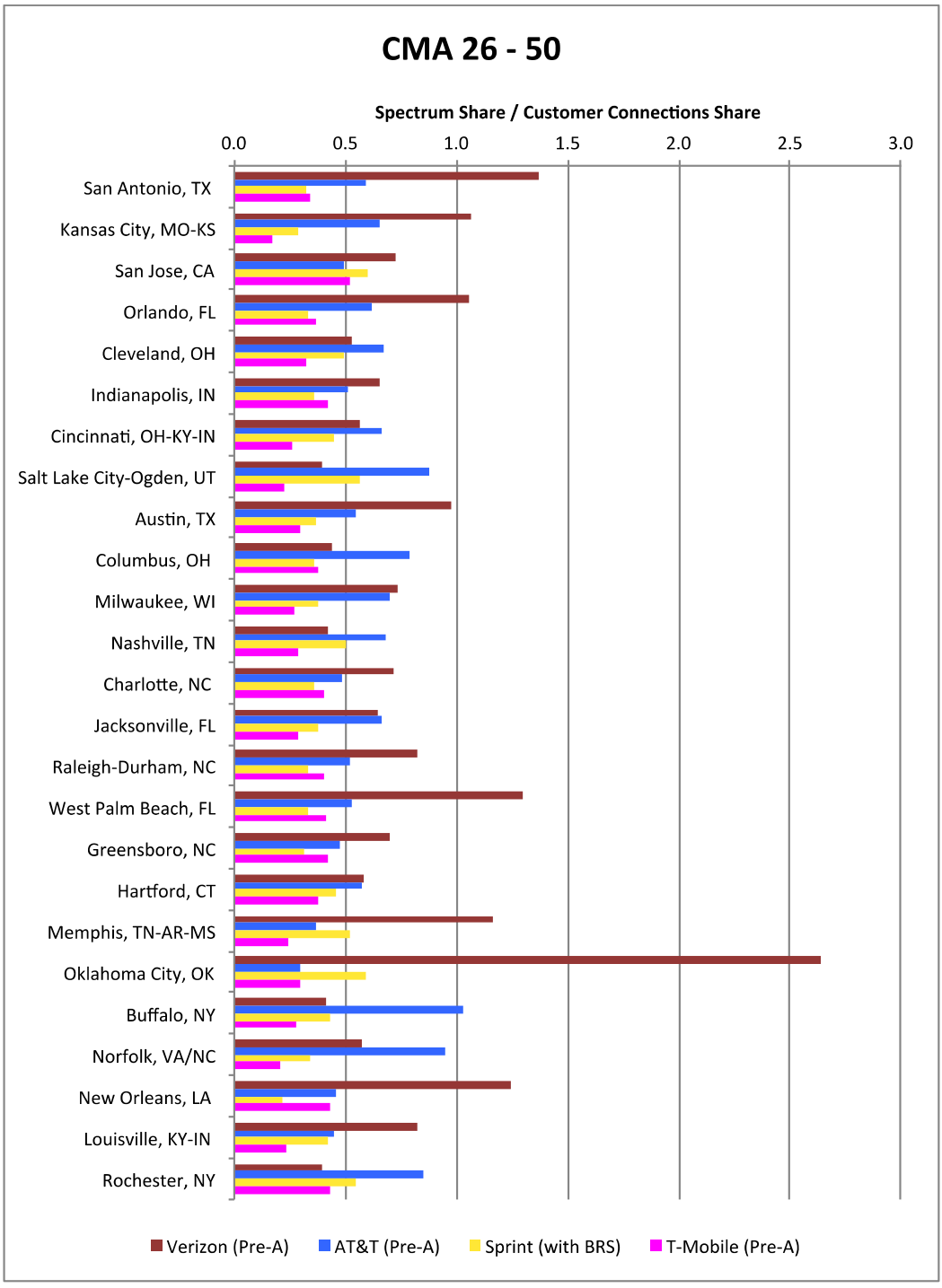


Figure 16: Scenario 3, Metric E_2 (Corrections: SP Data-YES, SP Mix-YES, Spectrum-YES) (smaller is better)

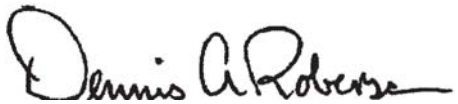
Conclusion

18. In summary, when correct comparisons are made, instead of the incomplete and therefore misleading ones presented by Applicants, it becomes clear that Verizon Wireless' claims of greater spectrum efficiency are simply wrong, and that Verizon Wireless is not a leader, but lags the industry in wringing the maximum use out of its spectrum. This is true under either metric of network operator efficiency: as measured by either customer connections per MHz of spectrum or the ratio of operator spectrum share to customer connections share. And it is true when Verizon Wireless' analysis is corrected for smartphone mix alone, for smartphone mix plus smartphone usage, or for both smartphone corrections plus spectrum differences.

[SIGNATURE ON NEXT PAGE]

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct to the best of my knowledge, information, and belief.

Executed this 26th day of May, 2012.



Dennis A. Roberson

REFERENCES

[1] "In the Matter of Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC For Consent To Assign Licenses and Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC For Consent To Assign Licenses"; WT Docket No. 12-4; PETITION TO DENY OF T-MOBILE, USA, INC.; February 21, 2012.

[2] "Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011–2016," *Cisco White Paper*, 2012.

[3] "In the Matter of Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo, LLC For Consent To Assign Licenses Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC For Consent To Assign Licenses;" WT Docket No. 12-4; JOINT OPPOSITION TO PETITIONS TO DENY AND COMMENTS

[4] "Telecom, Cable and Satellite, Spectrum and Competition Overview," J.P.Morgan, 5 March 2012.

[5] "Confessions of an iPhone Data Hog," *Wall Street Journal*, 27 January 2012.

APPENDIX

In the tables that follow, market share data is taken from "Q42011 Market Share Data," provided by **[***BEGIN CONFIDENTIAL***]** **[***END CONFIDENTIAL***]** to T-Mobile. Spectrum holdings information is taken from information assembled and prepared by T-Mobile based on FCC records.

T-Mobile Data

155,339,399 Total # Subs: 20,250,632

CMA Data			Market Share	# Subs
#	CMA Name	POPs		
1	Los Angeles-Long Beach/Anaheim-CA	17,174,570	13.8%	2,370,669
2	New York, NY-NJ/Nassau-Suffolk,NY/Newark	16,808,740	17.0%	2,864,344
3	Chicago, IL	8,507,569	16.9%	1,437,039
4	Dallas-Fort Worth, TX	6,557,576	12.1%	794,547
5	Houston, TX	5,637,211	20.6%	1,160,814
6	Philadelphia, PA	5,289,675	13.1%	692,813
7	Atlanta, GA	4,914,273	12.4%	608,269
8	Washington, DC-MD-VA	4,809,725	10.5%	506,339
9	Detroit/Ann Arbor, MI	4,733,459	9.7%	459,276
10	Boston-Lowell-Brockton-Lawrence-MANH	4,508,380	11.4%	514,959
11	San Francisco-Oakland, CA	4,375,435	8.3%	364,256
12	Miami-Fort Lauderdale-Hollywood, FL	4,302,210	15.6%	673,028
13	Phoenix, AZ	4,087,980	16.0%	654,379
14	Minneapolis-St. Paul, MN-WI	3,133,944	19.3%	603,311
15	San Diego, CA	3,088,346	11.7%	361,358
16	Denver-Boulder, CO	2,804,706	14.4%	404,285
17	Baltimore, MD	2,655,604	10.5%	278,032
18	Seattle-Everett, WA	2,652,469	16.6%	440,790
19	St. Louis, MO-IL	2,636,325	9.1%	239,761
20	Tampa-St. Petersburg, FL	2,593,519	13.0%	336,124
21	San Juan-Caguas, PR			0
22	Portland, OR-WA	2,119,028	12.3%	260,160
23	Sacramento, CA	1,973,687	7.8%	154,102
24	Pittsburgh, PA	1,959,627	7.7%	151,038
25	Las Vegas, NV	1,926,570	16.3%	313,992
26	San Antonio, TX	1926040	10.9%	210,221
27	Kansas City, MO-KS	1867083	17.6%	328,440
28	San Jose, CA	1813429	8.3%	150,969
29	Orlando, FL	1787599	12.3%	220,131
30	Cleveland, OH	1781739	10.2%	181,831
31	Indianapolis, IN	1715519	7.1%	121,525
32	Cincinnati, OH-KY-IN	1689049	9.5%	161,056
33	Salt Lake City-Ogden, UT	1654325	19.1%	315,808
34	Austin, TX	1641645	12.4%	203,094
35	Columbus, OH	1580339	9.9%	155,922
36	Milwaukee, WI	1568884	6.9%	108,876
37	Nashville-Davidson, TN	1521132	6.4%	96,683
38	Charlotte-Gastonia, NC	1349794	6.1%	82,907
39	Jacksonville, FL	1339750	12.8%	171,722
40	Raleigh-Durham, NC	1333905	6.1%	81,086
41	West Palm Beach-Boca Raton, FL	1290147	9.0%	115,518
42	Greensboro-Winston-Salem-High Point, NC	1237144	5.8%	72,286
43	Hartford-New Britain-Bristol, CT	1200820	8.2%	98,400
44	Memphis, TN-AR-MS	1197246	10.1%	120,981
45	Oklahoma City, OK	1193409	10.5%	125,183
46	Buffalo, NY	1123559	8.7%	98,185
47	Norfolk-Virginia Beach-Portsmouth, VA/NC	1099797	11.7%	129,102
48	New Orleans, LA	1092333	6.5%	71,363
49	Louisville, KY-IN	1046107	10.5%	110,362
50	Rochester, NY	1037977	7.3%	75,295

CMA Data		Pre-Acquisition Spectrum Holdings							
#	CMA Name	700 MHz	Cellular	SMR	PCS	AWS	BRS	Other	TOTAL
1	Los Angeles-Long Beach/Anaheim-CA	0.0	0.0	0.0	20.0	30.0	0.0	0.0	50.0
2	New York, NY-NJ/Nassau-Suffolk,NY/Newark	0.0	0.0	0.0	20.0	30.0	0.0	0.0	50.0
3	Chicago, IL	0.0	0.0	0.0	30.0	30.0	0.0	0.0	60.0
4	Dallas-Fort Worth, TX	0.0	0.0	0.0	30.0	20.0	0.0	0.0	50.0
5	Houston, TX	0.0	0.0	0.0	30.0	40.0	0.0	0.0	70.0
6	Philadelphia, PA	0.0	0.0	0.0	30.0	20.0	0.0	0.0	50.0
7	Atlanta, GA	0.0	0.0	0.0	30.0	40.0	0.0	0.0	70.0
8	Washington, DC-MD-VA	0.0	0.0	0.0	20.0	20.0	0.0	0.0	40.0
9	Detroit/Ann Arbor, MI	0.0	0.0	0.0	30.0	30.0	0.0	0.0	60.0
10	Boston-Lowell-Brockton-Lawrence-MANH	0.0	0.0	0.0	20.0	30.0	0.0	0.0	50.0
11	San Francisco-Oakland, CA	0.0	0.0	0.0	30.0	40.0	0.0	0.0	70.0
12	Miami-Fort Lauderdale-Hollywood, FL	0.0	0.0	0.0	20.0	40.0	0.0	0.0	60.0
13	Phoenix, AZ	0.0	0.0	0.0	30.0	30.0	0.0	0.0	60.0
14	Minneapolis-St. Paul, MN-WI	0.0	0.0	0.0	40.0	20.0	0.0	0.0	60.0
15	San Diego, CA	0.0	0.0	0.0	25.0	40.0	0.0	0.0	65.0
16	Denver-Boulder, CO	0.0	0.0	0.0	30.0	20.0	0.0	0.0	50.0
17	Baltimore, MD	0.0	0.0	0.0	30.0	20.0	0.0	0.0	50.0
18	Seattle-Everett, WA	0.0	0.0	0.0	30.0	30.0	0.0	0.0	60.0
19	St. Louis, MO-IL	0.0	0.0	0.0	30.0	10.0	0.0	0.0	40.0
20	Tampa-St. Petersburg, FL	0.0	0.0	0.0	25.0	40.0	0.0	0.0	65.0
21	San Juan-Caguas, PR	0.0	0.0	0.0	25.0	30.0	0.0	0.0	55.0
22	Portland, OR-WA	0.0	0.0	0.0	30.0	20.0	0.0	0.0	50.0
23	Sacramento, CA	0.0	0.0	0.0	25.0	40.0	0.0	0.0	65.0
24	Pittsburgh, PA	0.0	0.0	0.0	30.0	30.0	0.0	0.0	60.0
25	Las Vegas, NV	0.0	0.0	0.0	30.0	20.0	0.0	0.0	50.0
26	San Antonio, TX	0.0	0.0	0.0	30.0	30.0	0.0	0.0	60.0
27	Kansas City, MO-KS	0.0	0.0	0.0	40.0	10.0	0.0	0.0	50.0
28	San Jose, CA	0.0	0.0	0.0	30.0	40.0	0.0	0.0	70.0
29	Orlando, FL	0.0	0.0	0.0	32.5	40.0	0.0	0.0	72.5
30	Cleveland, OH	0.0	0.0	0.0	23.6	30.0	0.0	0.0	53.6
31	Indianapolis, IN	0.0	0.0	0.0	28.1	20.0	0.0	0.0	48.1
32	Cincinnati, OH-KY-IN	0.0	0.0	0.0	30.0	10.0	0.0	0.0	40.0
33	Salt Lake City-Ogden, UT	0.0	0.0	0.0	30.0	40.0	0.0	0.0	70.0
34	Austin, TX	0.0	0.0	0.0	30.0	30.0	0.0	0.0	60.0
35	Columbus, OH	0.0	0.0	0.0	30.0	30.0	0.0	0.0	60.0
36	Milwaukee, WI	0.0	0.0	0.0	20.0	10.0	0.0	0.0	30.0
37	Nashville-Davidson, TN	0.0	0.0	0.0	20.0	10.0	0.0	0.0	30.0
38	Charlotte-Gastonia, NC	0.0	0.0	0.0	20.0	20.0	0.0	0.0	40.0
39	Jacksonville, FL	0.0	0.0	0.0	30.0	30.0	0.0	0.0	60.0
40	Raleigh-Durham, NC	0.0	0.0	0.0	20.0	20.0	0.0	0.0	40.0
41	West Palm Beach-Boca Raton, FL	0.0	0.0	0.0	20.0	40.0	0.0	0.0	60.0
42	Greensboro-Winston-Salem-High Point, NC	0.0	0.0	0.0	20.0	20.0	0.0	0.0	40.0
43	Hartford-New Britain-Bristol, CT	0.0	0.0	0.0	20.0	30.0	0.0	0.0	50.0
44	Memphis, TN-AR-MS	0.0	0.0	0.0	30.0	10.0	0.0	0.0	40.0
45	Oklahoma City, OK	0.0	0.0	0.0	30.0	20.0	0.0	0.0	50.0
46	Buffalo, NY	0.0	0.0	0.0	30.0	10.0	0.0	0.0	40.0
47	Norfolk-Virginia Beach-Portsmouth, VA/NC	0.0	0.0	0.0	20.0	20.0	0.0	0.0	40.0
48	New Orleans, LA	0.0	0.0	0.0	25.0	20.0	0.0	0.0	45.0
49	Louisville, KY-IN	0.0	0.0	0.0	30.0	10.0	0.0	0.0	40.0
50	Rochester, NY	0.0	0.0	0.0	40.0	10.0	0.0	0.0	50.0

Verizon Data

155,339,399 Total # Subs: 45,605,703

CMA Data			Market Share	# Subs
#	CMA Name	POPs		
1	Los Angeles-Long Beach/Anaheim-CA	17,174,570	30.7%	5,267,194
2	New York, NY-NJ/Nassau-Suffolk,NY/Newark	16,808,740	33.3%	5,604,981
3	Chicago, IL	8,507,569	20.1%	1,714,156
4	Dallas-Fort Worth, TX	6,557,576	11.9%	782,909
5	Houston, TX	5,637,211	20.1%	1,130,526
6	Philadelphia, PA	5,289,675	32.7%	1,727,483
7	Atlanta, GA	4,914,273	27.3%	1,343,179
8	Washington, DC-MD-VA	4,809,725	32.4%	1,558,510
9	Detroit/Ann Arbor, MI	4,733,459	31.1%	1,473,950
10	Boston-Lowell-Brockton-Lawrence-MANH	4,508,380	40.8%	1,837,444
11	San Francisco-Oakland, CA	4,375,435	25.0%	1,092,887
12	Miami-Fort Lauderdale-Hollywood, FL	4,302,210	8.0%	346,011
13	Phoenix, AZ	4,087,980	45.5%	1,860,829
14	Minneapolis-St. Paul, MN-WI	3,133,944	37.6%	1,178,100
15	San Diego, CA	3,088,346	32.8%	1,012,709
16	Denver-Boulder, CO	2,804,706	39.2%	1,099,591
17	Baltimore, MD	2,655,604	36.1%	958,663
18	Seattle-Everett, WA	2,652,469	35.9%	951,945
19	St. Louis, MO-IL	2,636,325	17.2%	453,750
20	Tampa-St. Petersburg, FL	2,593,519	29.6%	768,925
21	San Juan-Caguas, PR			0
22	Portland, OR-WA	2,119,028	34.9%	738,693
23	Sacramento, CA	1,973,687	23.7%	466,907
24	Pittsburgh, PA	1,959,627	48.3%	947,327
25	Las Vegas, NV	1,926,570	22.6%	434,454
26	San Antonio, TX	1926040	10.1%	195,230
27	Kansas City, MO-KS	1867083	19.7%	367,378
28	San Jose, CA	1813429	25.0%	452,955
29	Orlando, FL	1787599	15.8%	282,836
30	Cleveland, OH	1781739	53.2%	947,579
31	Indianapolis, IN	1715519	32.2%	552,362
32	Cincinnati, OH-KY-IN	1689049	45.4%	766,180
33	Salt Lake City-Ogden, UT	1654325	37.6%	622,090
34	Austin, TX	1641645	14.2%	233,168
35	Columbus, OH	1580339	43.5%	687,958
36	Milwaukee, WI	1568884	18.0%	282,978
37	Nashville-Davidson, TN	1521132	41.7%	634,216
38	Charlotte-Gastonia, NC	1349794	42.8%	578,376
39	Jacksonville, FL	1339750	22.7%	304,572
40	Raleigh-Durham, NC	1333905	37.3%	496,949
41	West Palm Beach-Boca Raton, FL	1290147	15.5%	200,255
42	Greensboro-Winston-Salem-High Point, NC	1237144	42.4%	524,013
43	Hartford-New Britain-Bristol, CT	1200820	35.8%	429,849
44	Memphis, TN-AR-MS	1197246	18.1%	216,126
45	Oklahoma City, OK	1193409	9.2%	110,334
46	Buffalo, NY	1123559	45.9%	515,525
47	Norfolk-Virginia Beach-Portsmouth, VA/NC	1099797	45.2%	497,461
48	New Orleans, LA	1092333	16.4%	179,276
49	Louisville, KY-IN	1046107	21.2%	221,673
50	Rochester, NY	1037977	53.5%	555,240

CMA Data		Pre-Acquisition Spectrum Holdings							
#	CMA Name	700 MHz	Cellular	SMR	PCS	AWS	BRS	Other	TOTAL
1	Los Angeles-Long Beach/Anaheim-CA	46.0	25.0	0.0	20.0	0.0	0.0	0.0	91.0
2	New York, NY-NJ/Nassau-Suffolk,NY/Newark	34.0	25.0	0.0	40.0	20.0	0.0	0.0	119.0
3	Chicago, IL	46.0	25.0	0.0	10.0	20.0	0.0	0.0	101.0
4	Dallas-Fort Worth, TX	34.0	0.0	0.0	30.0	0.0	0.0	0.0	64.0
5	Houston, TX	34.0	25.0	0.0	20.0	0.0	0.0	0.0	79.0
6	Philadelphia, PA	34.0	25.0	0.0	20.0	20.0	0.0	0.0	99.0
7	Atlanta, GA	34.0	25.0	0.0	10.0	20.0	0.0	0.0	89.0
8	Washington, DC-MD-VA	34.0	25.0	0.0	30.0	20.0	0.0	0.0	109.0
9	Detroit/Ann Arbor, MI	34.0	25.0	0.0	10.0	20.0	0.0	0.0	89.0
10	Boston-Lowell-Brockton-Lawrence-MANH	22.0	25.0	0.0	30.0	20.0	0.0	0.0	97.0
11	San Francisco-Oakland, CA	34.0	25.0	0.0	10.0	0.0	0.0	0.0	69.0
12	Miami-Fort Lauderdale-Hollywood, FL	46.0	0.0	0.0	30.0	20.0	0.0	0.0	96.0
13	Phoenix, AZ	22.0	50.0	0.0	10.0	0.0	0.0	0.0	82.0
14	Minneapolis-St. Paul, MN-WI	34.0	25.0	0.0	20.0	20.0	0.0	0.0	99.0
15	San Diego, CA	22.0	25.0	0.0	20.0	0.0	0.0	0.0	67.0
16	Denver-Boulder, CO	34.0	25.0	0.0	20.0	0.0	0.0	0.0	79.0
17	Baltimore, MD	34.0	25.0	0.0	30.0	20.0	0.0	0.0	109.0
18	Seattle-Everett, WA	22.0	25.0	0.0	20.0	0.0	0.0	0.0	67.0
19	St. Louis, MO-IL	22.0	25.0	0.0	10.0	20.0	0.0	0.0	77.0
20	Tampa-St. Petersburg, FL	34.0	25.0	0.0	30.0	20.0	0.0	0.0	109.0
21	San Juan-Caguas, PR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	Portland, OR-WA	22.0	25.0	0.0	20.0	0.0	0.0	0.0	67.0
23	Sacramento, CA	34.0	25.0	0.0	10.0	0.0	0.0	0.0	69.0
24	Pittsburgh, PA	22.0	25.0	0.0	20.0	20.0	0.0	0.0	87.0
25	Las Vegas, NV	22.0	25.0	0.0	20.0	0.0	0.0	0.0	67.0
26	San Antonio, TX	34.0	0.0	0.0	30.0	0.0	0.0	0.0	64.0
27	Kansas City, MO-KS	34.0	25.0	0.0	10.0	20.0	0.0	0.0	89.0
28	San Jose, CA	34.0	25.0	0.0	10.0	0.0	0.0	0.0	69.0
29	Orlando, FL	34.0	0.0	0.0	30.0	20.0	0.0	0.0	84.0
30	Cleveland, OH	34.0	50.0	0.0	10.0	20.0	0.0	0.0	114.0
31	Indianapolis, IN	34.0	25.0	0.0	10.0	20.0	0.0	0.0	89.0
32	Cincinnati, OH-KY-IN	46.0	25.0	0.0	20.0	20.0	0.0	0.0	111.0
33	Salt Lake City-Ogden, UT	22.0	25.0	0.0	10.0	0.0	0.0	0.0	57.0
34	Austin, TX	34.0	0.0	0.0	30.0	0.0	0.0	0.0	64.0
35	Columbus, OH	22.0	25.0	0.0	20.0	20.0	0.0	0.0	87.0
36	Milwaukee, WI	22.0	0.0	0.0	30.0	20.0	0.0	0.0	72.0
37	Nashville-Davidson, TN	22.0	25.0	0.0	10.0	20.0	0.0	0.0	77.0
38	Charlotte-Gastonia, NC	34.0	50.0	0.0	30.0	20.0	0.0	0.0	134.0
39	Jacksonville, FL	22.0	0.0	0.0	40.0	20.0	0.0	0.0	82.0
40	Raleigh-Durham, NC	34.0	50.0	0.0	30.0	20.0	0.0	0.0	134.0
41	West Palm Beach-Boca Raton, FL	46.0	0.0	0.0	30.0	20.0	0.0	0.0	96.0
42	Greensboro-Winston-Salem-High Point, NC	34.0	50.0	0.0	20.0	20.0	0.0	0.0	124.0
43	Hartford-New Britain-Bristol, CT	34.0	25.0	0.0	10.0	20.0	0.0	0.0	89.0
44	Memphis, TN-AR-MS	34.0	25.0	0.0	10.0	20.0	0.0	0.0	89.0
45	Oklahoma City, OK	46.0	25.0	0.0	30.0	0.0	0.0	0.0	101.0
46	Buffalo, NY	22.0	25.0	0.0	20.0	20.0	0.0	0.0	87.0
47	Norfolk-Virginia Beach-Portsmouth, VA/NC	22.0	50.0	0.0	20.0	20.0	0.0	0.0	112.0
48	New Orleans, LA	22.0	25.0	0.0	30.0	20.0	0.0	0.0	97.0
49	Louisville, KY-IN	22.0	25.0	0.0	10.0	20.0	0.0	0.0	77.0
50	Rochester, NY	34.0	25.0	0.0	10.0	20.0	0.0	0.0	89.0

AT&T Data

155,339,399 Total # Subs: 47,237,753

CMA Data			Market Share	# Subs
#	CMA Name	POPs		
1	Los Angeles-Long Beach/Anaheim-CA	17,174,570	29.0%	4,973,870
2	New York, NY-NJ/Nassau-Suffolk,NY/Newark	16,808,740	24.6%	4,142,251
3	Chicago, IL	8,507,569	28.6%	2,434,486
4	Dallas-Fort Worth, TX	6,557,576	46.6%	3,057,656
5	Houston, TX	5,637,211	32.2%	1,813,583
6	Philadelphia, PA	5,289,675	31.1%	1,644,241
7	Atlanta, GA	4,914,273	35.1%	1,725,431
8	Washington, DC-MD-VA	4,809,725	29.2%	1,406,045
9	Detroit/Ann Arbor, MI	4,733,459	23.2%	1,097,915
10	Boston-Lowell-Brockton-Lawrence-MANH	4,508,380	28.5%	1,284,499
11	San Francisco-Oakland, CA	4,375,435	44.2%	1,933,333
12	Miami-Fort Lauderdale-Hollywood, FL	4,302,210	33.1%	1,424,730
13	Phoenix, AZ	4,087,980	15.2%	623,020
14	Minneapolis-St. Paul, MN-WI	3,133,944	21.4%	671,428
15	San Diego, CA	3,088,346	31.3%	967,403
16	Denver-Boulder, CO	2,804,706	24.6%	690,837
17	Baltimore, MD	2,655,604	25.3%	671,248
18	Seattle-Everett, WA	2,652,469	30.1%	799,714
19	St. Louis, MO-IL	2,636,325	40.9%	1,077,049
20	Tampa-St. Petersburg, FL	2,593,519	24.1%	625,204
21	San Juan-Caguas, PR			0
22	Portland, OR-WA	2,119,028	34.0%	720,253
23	Sacramento, CA	1,973,687	43.8%	863,818
24	Pittsburgh, PA	1,959,627	24.6%	481,919
25	Las Vegas, NV	1,926,570	30.6%	590,376
26	San Antonio, TX	1926040	38.3%	736,730
27	Kansas City, MO-KS	1867083	28.9%	539,631
28	San Jose, CA	1813429	44.2%	801,283
29	Orlando, FL	1787599	36.5%	653,166
30	Cleveland, OH	1781739	20.5%	365,563
31	Indianapolis, IN	1715519	36.9%	632,567
32	Cincinnati, OH-KY-IN	1689049	22.1%	372,677
33	Salt Lake City-Ogden, UT	1654325	25.1%	416,051
34	Austin, TX	1641645	43.9%	719,862
35	Columbus, OH	1580339	22.5%	355,346
36	Milwaukee, WI	1568884	25.4%	398,029
37	Nashville-Davidson, TN	1521132	28.7%	435,873
38	Charlotte-Gastonia, NC	1349794	24.8%	334,915
39	Jacksonville, FL	1339750	36.0%	481,832
40	Raleigh-Durham, NC	1333905	23.1%	307,723
41	West Palm Beach-Boca Raton, FL	1290147	39.7%	512,125
42	Greensboro-Winston-Salem-High Point, NC	1237144	22.6%	279,691
43	Hartford-New Britain-Bristol, CT	1200820	36.6%	438,966
44	Memphis, TN-AR-MS	1197246	46.1%	552,521
45	Oklahoma City, OK	1193409	57.1%	682,032
46	Buffalo, NY	1123559	21.7%	244,286
47	Norfolk-Virginia Beach-Portsmouth, VA/NC	1099797	16.0%	175,760
48	New Orleans, LA	1092333	39.5%	431,829
49	Louisville, KY-IN	1046107	42.0%	439,645
50	Rochester, NY	1037977	20.2%	209,345

CMA Data		Pre-Acquisition Spectrum Holdings							
#	CMA Name	700 MHz	Cellular	SMR	PCS	AWS	BRS	Other	TOTAL
1	Los Angeles-Long Beach/Anaheim-CA	24.0	25.0	0.0	40.0	30.0	0.0	0.0	119.0
2	New York, NY-NJ/Nassau-Suffolk,NY/Newark	36.0	25.0	0.0	30.0	0.0	0.0	0.0	91.0
3	Chicago, IL	18.0	25.0	0.0	40.0	10.0	0.0	0.0	93.0
4	Dallas-Fort Worth, TX	30.0	50.0	0.0	20.0	30.0	0.0	0.0	130.0
5	Houston, TX	30.0	25.0	0.0	40.0	10.0	0.0	0.0	105.0
6	Philadelphia, PA	36.0	25.0	0.0	40.0	0.0	0.0	0.0	101.0
7	Atlanta, GA	30.0	25.0	0.0	40.0	10.0	0.0	0.0	105.0
8	Washington, DC-MD-VA	30.0	25.0	0.0	40.0	10.0	0.0	0.0	105.0
9	Detroit/Ann Arbor, MI	30.0	25.0	0.0	40.0	0.0	0.0	0.0	95.0
10	Boston-Lowell-Brockton-Lawrence-MANH	36.0	25.0	0.0	40.0	10.0	0.0	0.0	111.0
11	San Francisco-Oakland, CA	36.0	25.0	0.0	40.0	10.0	0.0	0.0	111.0
12	Miami-Fort Lauderdale-Hollywood, FL	18.0	50.0	0.0	20.0	10.0	0.0	0.0	98.0
13	Phoenix, AZ	30.0	0.0	0.0	40.0	30.0	0.0	0.0	100.0
14	Minneapolis-St. Paul, MN-WI	30.0	25.0	0.0	30.0	9.7	0.0	0.0	94.7
15	San Diego, CA	30.0	25.0	0.0	35.0	10.0	0.0	0.0	100.0
16	Denver-Boulder, CO	30.0	25.0	0.0	30.0	30.0	0.0	0.0	115.0
17	Baltimore, MD	30.0	25.0	0.0	40.0	10.0	0.0	0.0	105.0
18	Seattle-Everett, WA	30.0	25.0	0.0	40.0	10.0	0.0	0.0	105.0
19	St. Louis, MO-IL	30.0	25.0	0.0	40.0	0.0	0.0	0.0	95.0
20	Tampa-St. Petersburg, FL	30.0	25.0	0.0	30.0	0.0	0.0	0.0	85.0
21	San Juan-Caguas, PR	18.0	25.0	0.0	50.0	10.0	0.0	0.0	103.0
22	Portland, OR-WA	30.0	25.0	0.0	30.0	30.0	0.0	0.0	115.0
23	Sacramento, CA	30.0	25.0	0.0	45.0	10.0	0.0	0.0	110.0
24	Pittsburgh, PA	30.0	25.0	0.0	30.0	0.0	0.0	0.0	85.0
25	Las Vegas, NV	30.0	25.0	0.0	40.0	10.0	0.0	0.0	105.0
26	San Antonio, TX	30.0	50.0	0.0	10.0	10.0	0.0	0.0	100.0
27	Kansas City, MO-KS	30.0	25.0	0.0	30.0	10.0	0.0	0.0	95.0
28	San Jose, CA	36.0	25.0	0.0	40.0	10.0	0.0	0.0	111.0
29	Orlando, FL	30.0	50.0	0.0	20.0	0.0	0.0	0.0	100.0
30	Cleveland, OH	30.0	0.0	0.0	50.0	0.0	0.0	0.0	80.0
31	Indianapolis, IN	30.0	25.0	0.0	40.0	0.0	0.0	0.0	95.0
32	Cincinnati, OH-KY-IN	18.0	25.0	0.0	10.0	20.0	0.0	0.0	73.0
33	Salt Lake City-Ogden, UT	30.0	25.0	0.0	45.0	20.0	0.0	0.0	120.0
34	Austin, TX	30.0	50.0	0.0	20.0	10.0	0.0	0.0	110.0
35	Columbus, OH	30.0	25.0	0.0	30.0	0.0	0.0	0.0	85.0
36	Milwaukee, WI	30.0	25.0	0.0	30.0	0.0	0.0	0.0	85.0
37	Nashville-Davidson, TN	30.0	25.0	0.0	45.0	0.0	0.0	0.0	100.0
38	Charlotte-Gastonia, NC	18.0	0.0	0.0	40.0	20.0	0.0	0.0	78.0
39	Jacksonville, FL	30.0	50.0	0.0	10.0	20.0	0.0	0.0	110.0
40	Raleigh-Durham, NC	18.0	0.0	0.0	40.0	20.0	0.0	0.0	78.0
41	West Palm Beach-Boca Raton, FL	18.0	50.0	0.0	20.0	10.0	0.0	0.0	98.0
42	Greensboro-Winston-Salem-High Point, NC	18.0	0.0	0.0	30.0	20.0	0.0	0.0	68.0
43	Hartford-New Britain-Bristol, CT	36.0	25.0	0.0	45.0	0.0	0.0	0.0	106.0
44	Memphis, TN-AR-MS	18.0	25.0	0.0	30.0	20.0	0.0	0.0	93.0
45	Oklahoma City, OK	18.0	25.0	0.0	20.0	30.0	0.0	0.0	93.0
46	Buffalo, NY	30.0	25.0	0.0	28.1	40.0	0.0	0.0	123.1
47	Norfolk-Virginia Beach-Portsmouth, VA/NC	30.0	0.0	0.0	40.0	20.0	0.0	0.0	90.0
48	New Orleans, LA	30.0	25.0	0.0	35.0	0.0	0.0	0.0	90.0
49	Louisville, KY-IN	30.0	25.0	0.0	39.3	0.0	0.0	0.0	94.3
50	Rochester, NY	18.0	25.0	0.0	30.0	20.0	0.0	0.0	93.0

Sprint Data

155,339,399 Total # Subs: 30,408,895

CMA Data			Market Share	# Subs
#	CMA Name	POPs		
1	Los Angeles-Long Beach/Anaheim-CA	17,174,570	18.9%	3,250,625
2	New York, NY-NJ/Nassau-Suffolk,NY/Newark	16,808,740	20.4%	3,421,705
3	Chicago, IL	8,507,569	21.7%	1,848,405
4	Dallas-Fort Worth, TX	6,557,576	17.1%	1,119,315
5	Houston, TX	5,637,211	20.5%	1,153,108
6	Philadelphia, PA	5,289,675	17.1%	905,723
7	Atlanta, GA	4,914,273	15.8%	777,282
8	Washington, DC-MD-VA	4,809,725	24.0%	1,153,274
9	Detroit/Ann Arbor, MI	4,733,459	26.0%	1,231,681
10	Boston-Lowell-Brockton-Lawrence-MANH	4,508,380	14.3%	645,624
11	San Francisco-Oakland, CA	4,375,435	13.5%	590,898
12	Miami-Fort Lauderdale-Hollywood, FL	4,302,210	19.7%	847,586
13	Phoenix, AZ	4,087,980	15.6%	639,165
14	Minneapolis-St. Paul, MN-WI	3,133,944	21.7%	681,105
15	San Diego, CA	3,088,346	19.5%	602,460
16	Denver-Boulder, CO	2,804,706	14.1%	396,627
17	Baltimore, MD	2,655,604	24.4%	647,044
18	Seattle-Everett, WA	2,652,469	16.9%	447,813
19	St. Louis, MO-IL	2,636,325	24.8%	652,797
20	Tampa-St. Petersburg, FL	2,593,519	20.6%	533,910
21	San Juan-Caguas, PR			0
22	Portland, OR-WA	2,119,028	13.5%	285,489
23	Sacramento, CA	1,973,687	13.4%	264,401
24	Pittsburgh, PA	1,959,627	13.5%	263,655
25	Las Vegas, NV	1,926,570	19.3%	371,701
26	San Antonio, TX	1926040	27.5%	528,849
27	Kansas City, MO-KS	1867083	29.7%	555,137
28	San Jose, CA	1813429	13.5%	244,902
29	Orlando, FL	1787599	25.4%	454,467
30	Cleveland, OH	1781739	16.1%	286,766
31	Indianapolis, IN	1715519	23.2%	397,226
32	Cincinnati, OH-KY-IN	1689049	18.2%	306,686
33	Salt Lake City-Ogden, UT	1654325	14.1%	232,596
34	Austin, TX	1641645	24.0%	393,282
35	Columbus, OH	1580339	24.1%	381,114
36	Milwaukee, WI	1568884	20.9%	327,570
37	Nashville-Davidson, TN	1521132	17.3%	263,786
38	Charlotte-Gastonia, NC	1349794	22.5%	303,894
39	Jacksonville, FL	1339750	21.3%	285,489
40	Raleigh-Durham, NC	1333905	24.6%	328,025
41	West Palm Beach-Boca Raton, FL	1290147	20.3%	262,142
42	Greensboro-Winston-Salem-High Point, NC	1237144	23.7%	293,641
43	Hartford-New Britain-Bristol, CT	1200820	18.5%	222,364
44	Memphis, TN-AR-MS	1197246	15.6%	186,422
45	Oklahoma City, OK	1193409	13.9%	166,224
46	Buffalo, NY	1123559	18.0%	201,963
47	Norfolk-Virginia Beach-Portsmouth, VA/NC	1099797	24.3%	266,836
48	New Orleans, LA	1092333	37.5%	409,865
49	Louisville, KY-IN	1046107	20.8%	217,748
50	Rochester, NY	1037977	15.5%	160,509

CMA Data		With BRS Spectrum Holdings							
#	CMA Name	700 MHz	Cellular	SMR	PCS	AWS	BRS	Other	TOTAL
1	Los Angeles-Long Beach/Anaheim-CA	0.0	0.0	17.1	40.0	0.0	55.5	0.0	112.6
2	New York, NY-NJ/Nassau-Suffolk,NY/Newark	0.0	0.0	18.0	40.0	0.0	45.1	0.0	103.0
3	Chicago, IL	0.0	0.0	17.8	30.0	0.0	55.5	0.0	103.3
4	Dallas-Fort Worth, TX	0.0	0.0	17.6	40.0	0.0	55.5	0.0	113.1
5	Houston, TX	0.0	0.0	18.4	30.0	0.0	55.5	0.0	103.9
6	Philadelphia, PA	0.0	0.0	17.8	40.0	0.0	55.5	0.0	113.3
7	Atlanta, GA	0.0	0.0	18.0	30.0	0.0	55.5	0.0	103.5
8	Washington, DC-MD-VA	0.0	0.0	18.4	40.0	0.0	43.5	0.0	101.9
9	Detroit/Ann Arbor, MI	0.0	0.0	17.8	40.0	0.0	55.5	0.0	113.3
10	Boston-Lowell-Brockton-Lawrence-MANH	0.0	0.0	16.0	40.0	0.0	39.0	0.0	95.0
11	San Francisco-Oakland, CA	0.0	0.0	18.4	30.0	0.0	51.9	0.0	100.3
12	Miami-Fort Lauderdale-Hollywood, FL	0.0	0.0	16.5	30.0	0.0	44.0	0.0	90.5
13	Phoenix, AZ	0.0	0.0	17.0	40.0	0.0	55.5	0.0	112.5
14	Minneapolis-St. Paul, MN-WI	0.0	0.0	18.5	30.0	0.0	55.4	0.0	103.9
15	San Diego, CA	0.0	0.0	15.8	40.0	0.0	50.0	0.0	105.8
16	Denver-Boulder, CO	0.0	0.0	16.5	26.3	0.0	55.5	0.0	98.3
17	Baltimore, MD	0.0	0.0	18.2	30.0	0.0	55.5	0.0	103.7
18	Seattle-Everett, WA	0.0	0.0	16.0	40.0	0.0	55.5	0.0	111.5
19	St. Louis, MO-IL	0.0	0.0	17.2	40.0	0.0	55.5	0.0	112.7
20	Tampa-St. Petersburg, FL	0.0	0.0	17.3	35.0	0.0	55.5	0.0	107.8
21	San Juan-Caguas, PR	0.0	0.0	17.0	30.0	0.0	49.6	0.0	96.6
22	Portland, OR-WA	0.0	0.0	18.5	40.0	0.0	55.5	0.0	114.0
23	Sacramento, CA	0.0	0.0	18.4	30.0	0.0	54.4	0.0	102.8
24	Pittsburgh, PA	0.0	0.0	18.1	40.0	0.0	45.0	0.0	103.0
25	Las Vegas, NV	0.0	0.0	17.3	40.0	0.0	28.0	0.0	85.3
26	San Antonio, TX	0.0	0.0	18.1	40.0	0.0	55.5	0.0	113.6
27	Kansas City, MO-KS	0.0	0.0	17.3	40.0	0.0	55.5	0.0	112.8
28	San Jose, CA	0.0	0.0	18.4	30.0	0.0	55.5	0.0	103.9
29	Orlando, FL	0.0	0.0	17.0	37.5	0.0	55.5	0.0	110.0
30	Cleveland, OH	0.0	0.0	17.1	30.0	0.0	55.5	0.0	102.6
31	Indianapolis, IN	0.0	0.0	18.1	31.9	0.0	55.5	0.0	105.5
32	Cincinnati, OH-KY-IN	0.0	0.0	18.1	30.0	0.0	55.5	0.0	103.6
33	Salt Lake City-Ogden, UT	0.0	0.0	16.8	30.0	0.0	55.5	0.0	102.3
34	Austin, TX	0.0	0.0	18.0	40.0	0.0	55.5	0.0	113.5
35	Columbus, OH	0.0	0.0	17.9	40.0	0.0	55.5	0.0	113.4
36	Milwaukee, WI	0.0	0.0	18.8	30.0	0.0	50.1	0.0	98.8
37	Nashville-Davidson, TN	0.0	0.0	17.7	40.0	0.0	55.5	0.0	113.2
38	Charlotte-Gastonia, NC	0.0	0.0	17.8	30.0	0.0	55.5	0.0	103.3
39	Jacksonville, FL	0.0	0.0	17.9	30.0	0.0	55.5	0.0	103.4
40	Raleigh-Durham, NC	0.0	0.0	17.8	30.0	0.0	55.5	0.0	103.3
41	West Palm Beach-Boca Raton, FL	0.0	0.0	16.5	30.0	0.0	39.0	0.0	85.5
42	Greensboro-Winston-Salem-High Point, NC	0.0	0.0	17.7	40.0	0.0	37.3	0.0	95.0
43	Hartford-New Britain-Bristol, CT	0.0	0.0	16.1	40.0	0.0	55.5	0.0	111.6
44	Memphis, TN-AR-MS	0.0	0.0	18.3	30.0	0.0	55.5	0.0	103.8
45	Oklahoma City, OK	0.0	0.0	18.8	30.0	0.0	55.5	0.0	104.3
46	Buffalo, NY	0.0	0.0	15.3	40.0	0.0	44.5	0.0	99.8
47	Norfolk-Virginia Beach-Portsmouth, VA/NC	0.0	0.0	18.5	30.0	0.0	55.5	0.0	104.0
48	New Orleans, LA	0.0	0.0	18.3	36.0	0.0	49.7	0.0	103.9
49	Louisville, KY-IN	0.0	0.0	17.4	40.0	0.0	55.5	0.0	112.9
50	Rochester, NY	0.0	0.0	15.2	40.0	0.0	55.5	0.0	110.7

Attachment 1

Excerpt from T-Mobile May 11, 2012 Presentation To Commission Staff

Rewarding Spectrum Inefficiency is Not in the Public Interest

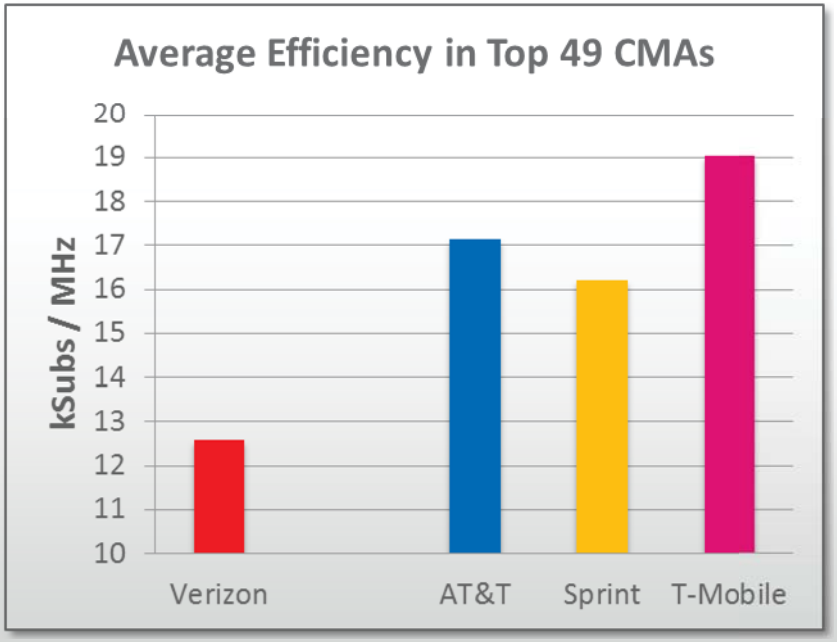
An efficiency analysis shows Verizon is the ***least efficient*** among major carriers when adjusted for smartphone penetration and low band spectrum holdings

Worst in all of the top 5 CMAs

Worst in 8 of the top 10 CMAs

Worst in 25 of the top 49 CMAs

Worst average efficiency in top 49 CMAs



The analysis set forth above is based upon Q4 2011 smartphone penetration numbers set forth in J.P. Morgan Telecom, Cable and Satellite Spectrum and Competition Overview 4Q 2011 Wrap-Up and 2012 Outlook, Mar. 5, 2012, and the spectrum recently approved for transfer from AT&T to T-Mobile was therefore included as part of AT&T's spectrum holdings. The inclusion of that spectrum as part of T-Mobile's portfolio would not change Verizon's position as the least efficient of the four carriers. *See Analysis* Declaration of Dennis Roberson, Replies of T-Mobile USA Inc, WT-Docket 12-4 (filed Mar. 26, 2012).
A preliminary analysis using publicly released Q1 2012 smartphone penetration numbers available as of May 4, 2012 suggests Verizon's efficiency continues to lag the market.

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